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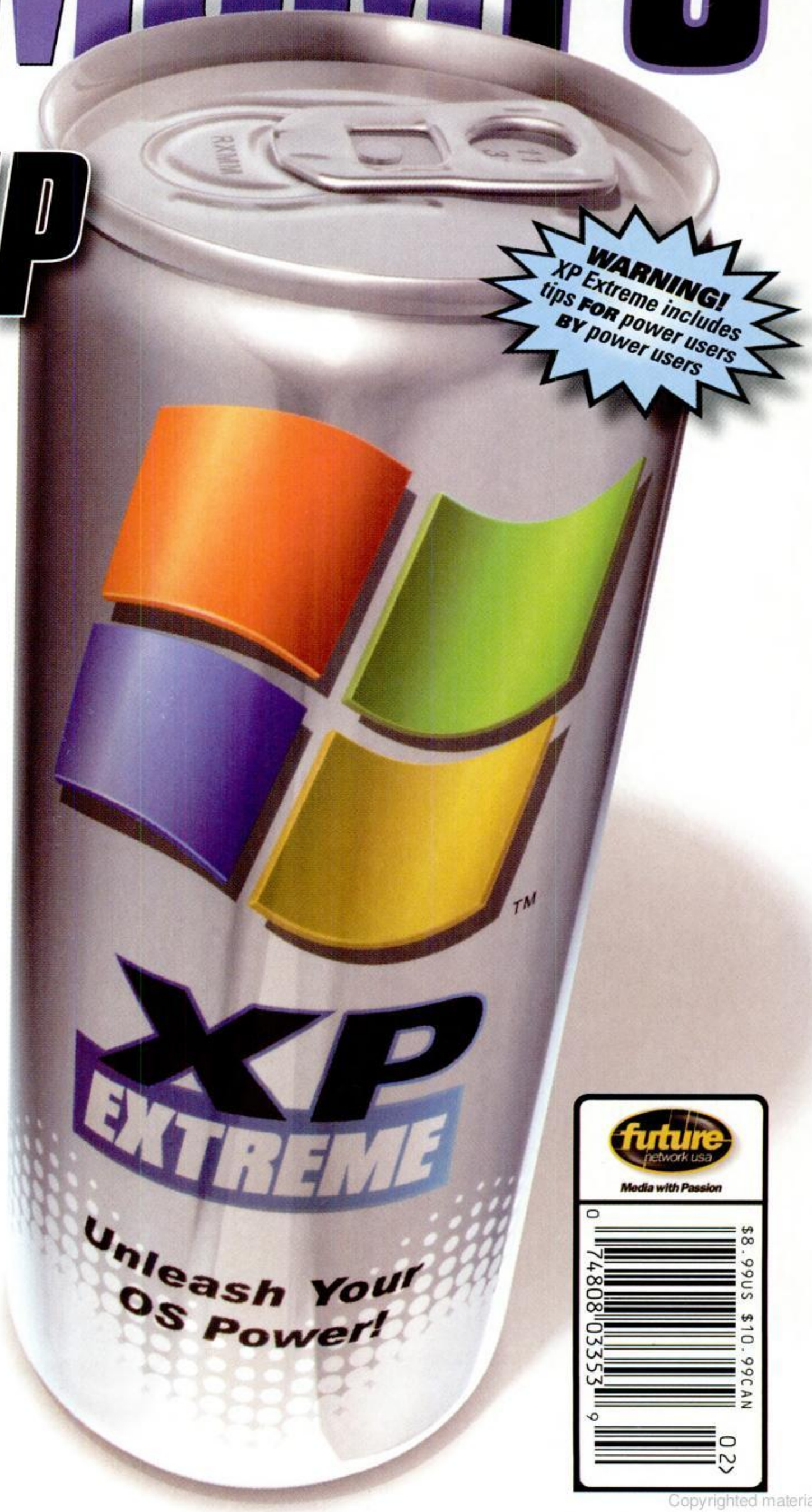

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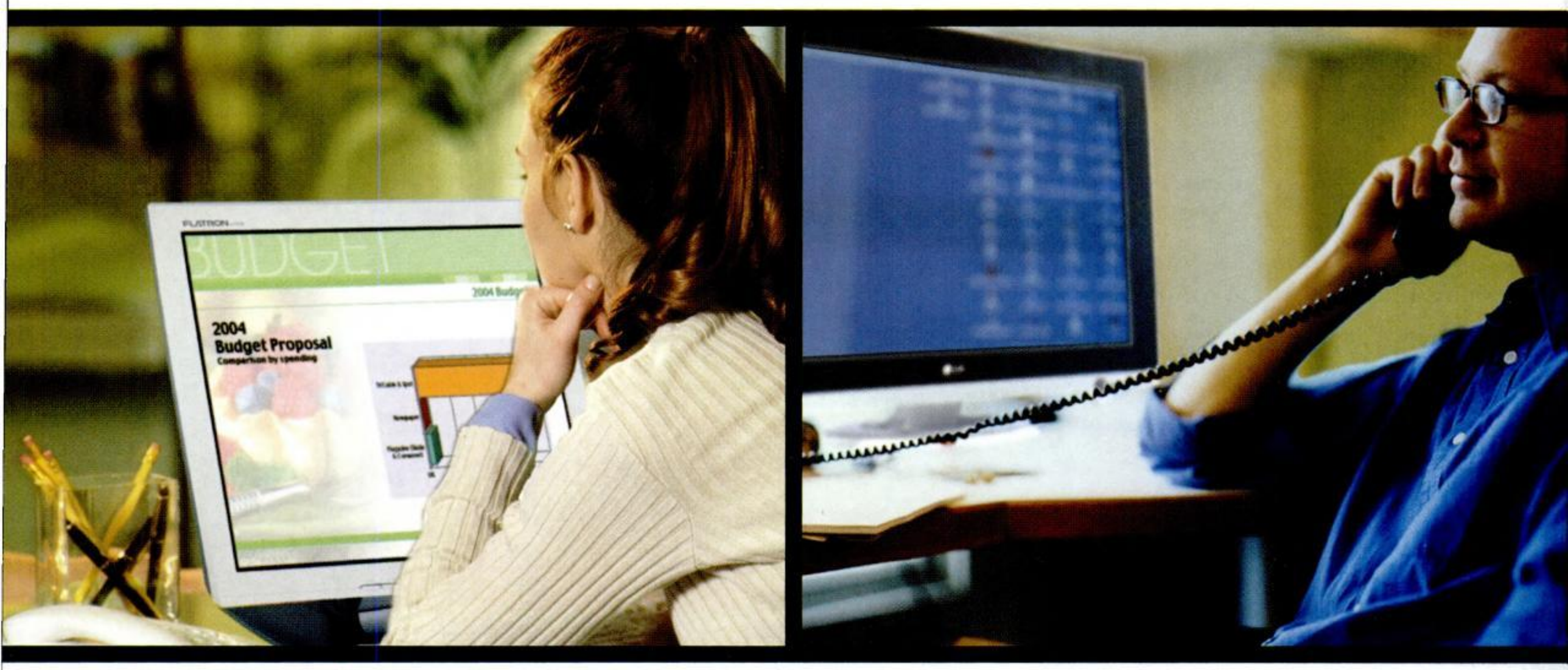

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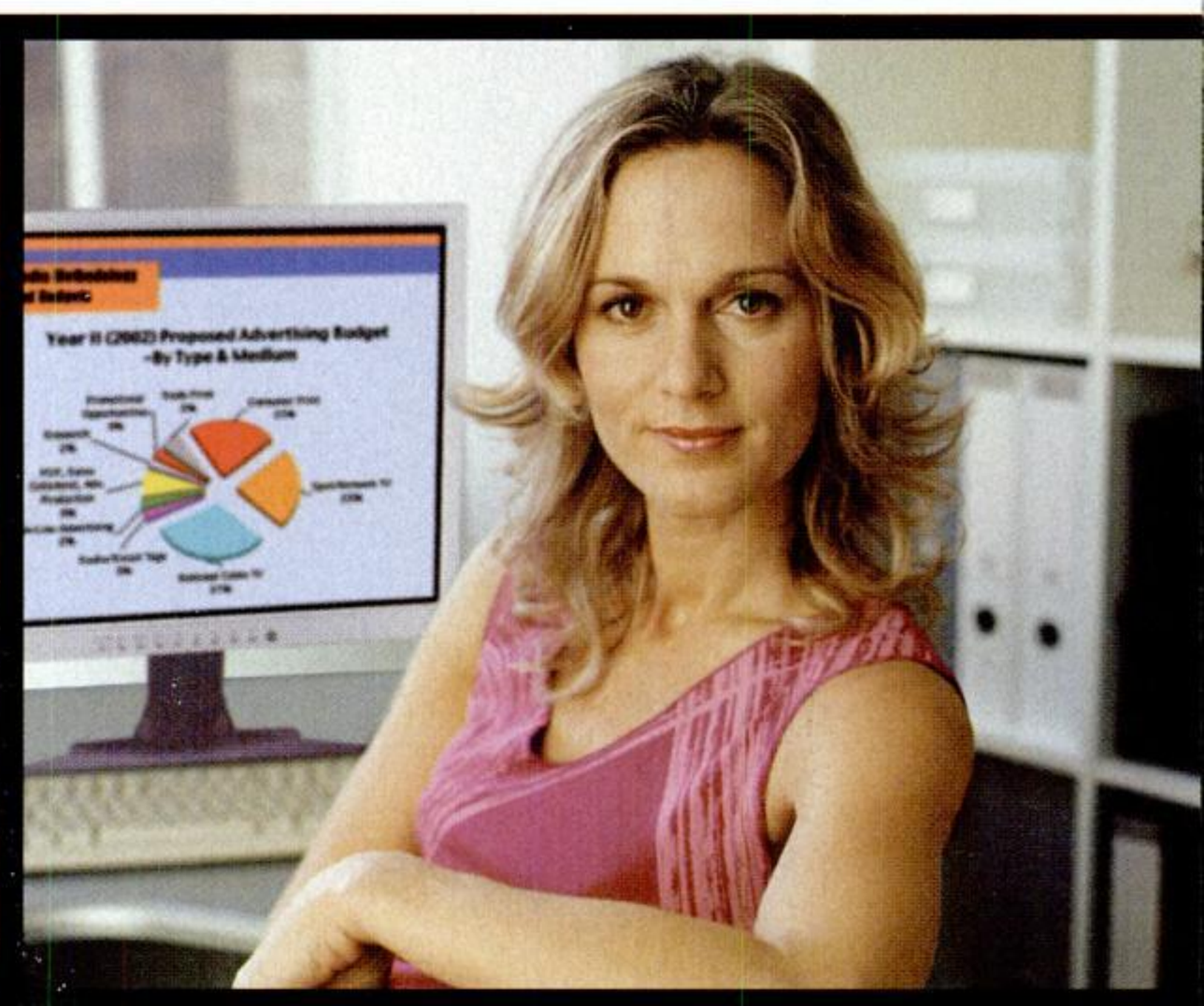

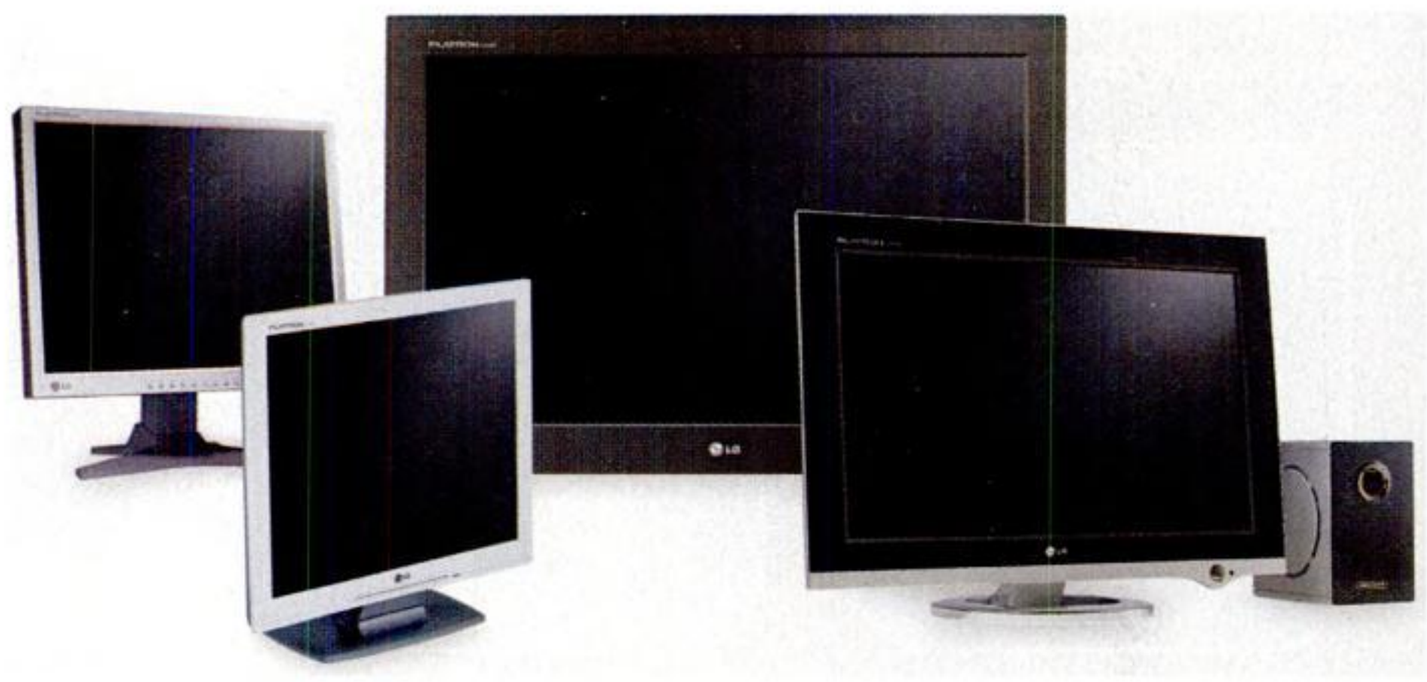

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Release Notes

You Can't Do That... Or Can You?

Years ago, I woke up at six o'clock one morning to find an ex-girlfriend lurking beside my bed and body. She was staring at me in a slightly stalker-esque, albeit nonviolent stalker-esque, fashion. She wanted to talk a little more about our break-up, she quietly explained, so she entered my apartment through a garage door one of my neighbors had left open.

The incident remains one of the most frightening encounters in my whole life. Had she wanted to hurt me, she could have. Thankfully, she just wanted to talk. Had I wished, I could have gone to the local San Francisco police station and filed a report that could have resulted in a restraining order preventing future violations of my personal space, or at least making such violations illegal.

Here's where it gets interesting... and a little scary. In the second edition of our PC Rights story (page 42), our legal experts answer a question about digital stalking—a situation where an ex guessed a password and went snooping around in someone's e-mail—by replying that, unless the digital interloper committed malicious damage (in the form of fraudulent e-mails, checking account hijacking, or otherwise), the digital stalkee has no recourse. The gist is that it's not an enforceable violation if you digitally trespass.

That's shocking. Hacking into someone's e-mail via a password or otherwise, is the digital equivalent of entering someone's bedroom without permission. And it's just as frightening. You can't break into someone's house and sit in their living room. Why should the online equivalent be any less punishable? More frightening than that is the implicit assumption behind this disparity that the realm of digital bytes is inherently less private than the realm of atomical bits. Invasion of either plane of existence is horrifying; why is the "real world" protected more than the digital?

Conspiracy theorists would quickly point out that the reason behind such a lack of enforceable privacy is that the government sees great value in being able to monitor an individual's digital life.

A more practical and realistic explanation says that the explosive growth of the digital realm has outpaced the rate at which traditional bit-based law can react and govern it. If we're just now getting around to digital rights and copyright infringement, how long before the law addresses nondamaging digital stalking?

Typically, landmark legal rulings are reactive, and borne out of extreme situations or high-profile violations. But in a world where we take digital intrusion for granted, will such an explosive case ever be brought to trial?

I've never been one to argue for more, rather than less, governing, but while the government is closely examining copyrights and corporations' digital rights, they should probably take a long, hard look at personal rights in the digital domain. Here's hoping they get things figured out by the time the next sci-tech revolution—genetic modification and cloning—starts.

—GEORGE JONES
george@maximumpc.com

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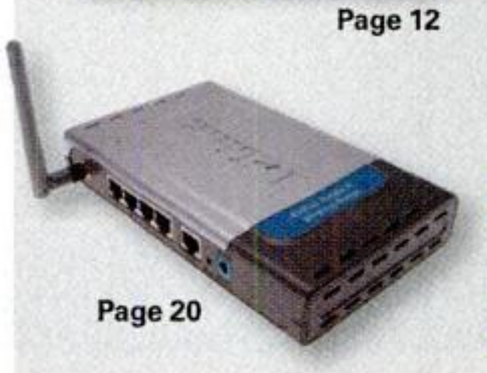

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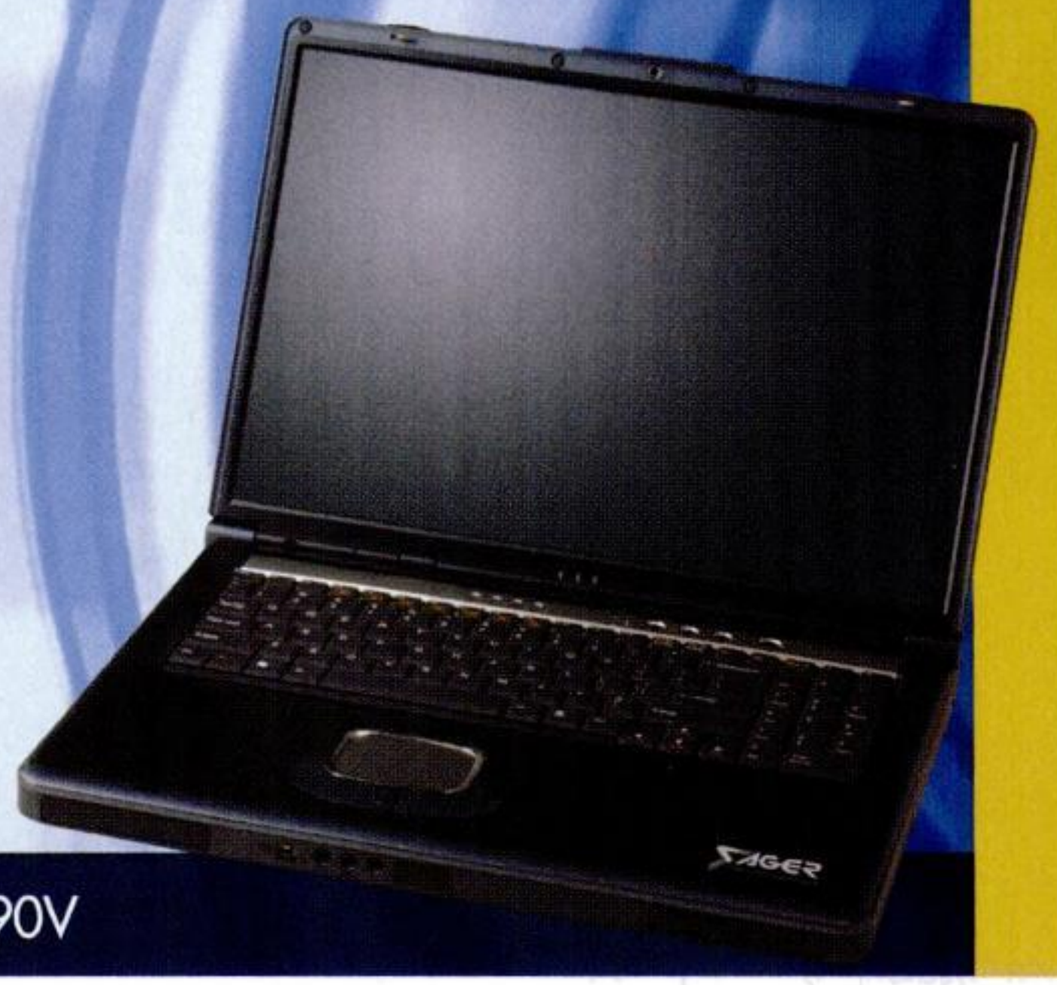

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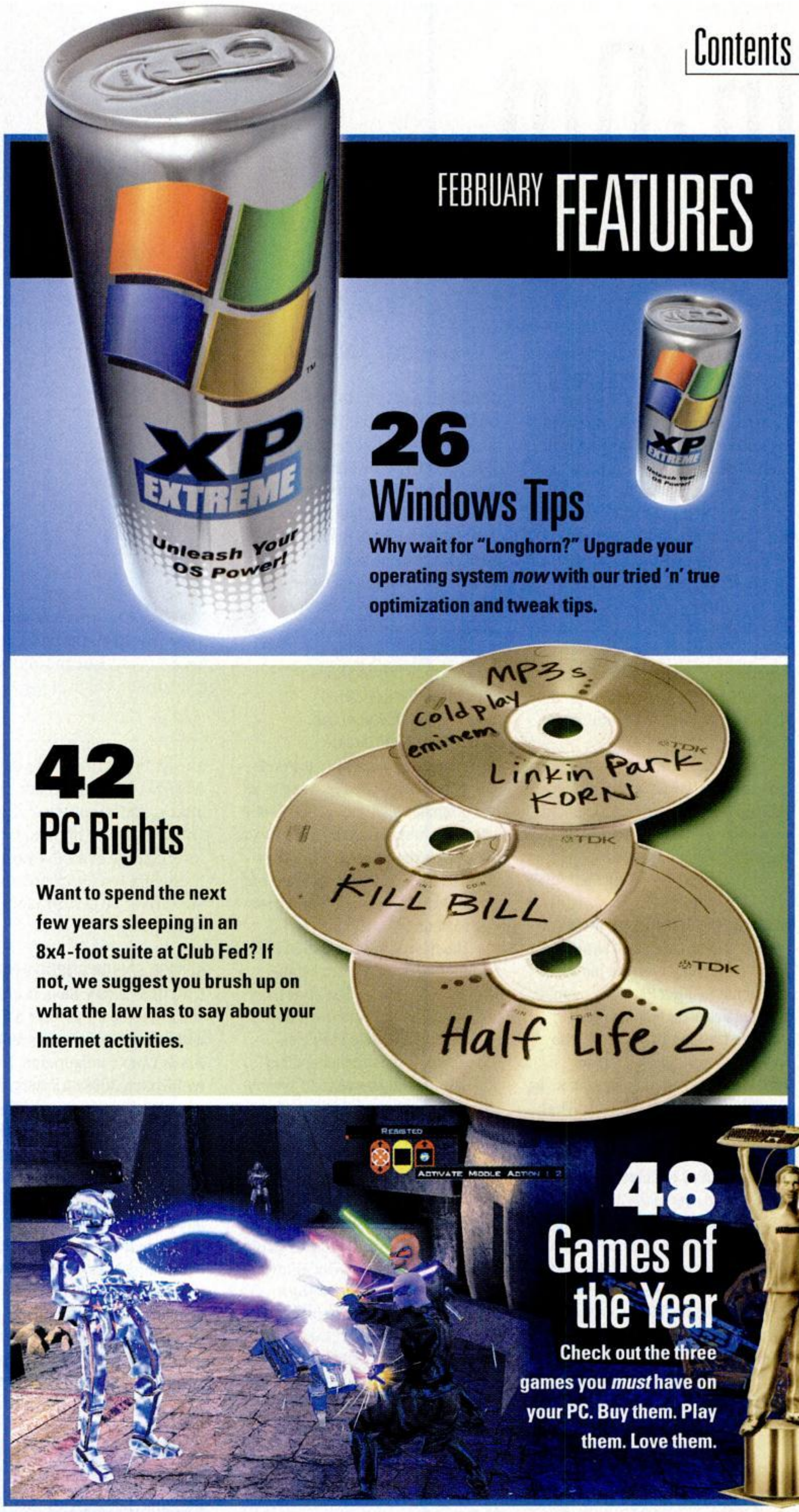

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In/Out

You write, we respond

HYPER-ACTIVE ON THE CHEAP?

I have a question about an alleged Hyper-Threading product that supposedly allows non-HT P4s to become "activated" Hyper-Threaded CPUs. A friend of mine told me he saw an article that claimed some company is selling an inexpensive ($20-$40) sheet of silicon that sits between the CPU and the motherboard and allows the CPU to act like a Hyper-Threaded P4. I'm not sure whether he's pulling my leg, but I'm pretty sure there'd be a large market for such a product. Heck, I want one! If this is true, why haven't I seen an article about it in *Maximum PC*, and where can I get one?

As a final comment, I'd like to say that your magazine simply has the most outstanding coverage on PC rigs and gear. It rocks!

—R. NOLASCO

SENIOR EDITOR GORDON MAH UNG RESPONDS: When Intel "turned-on" Hyper-Threading with the introduction of the 3.06GHz P4, many people worked overtime to find a hack to activate the feature in older CPUs (where it was included but not enabled). From what I understand, no one has successfully done it. What your buddy may be thinking of is a product like PowerLeap's PL-iP4. This doohickey enables support for 3.06GHz P4s even if the motherboard doesn't offer such support. It also lets motherboards that don't support Hyper-Threading run with the feature on. From what I understand though, you still need an HT-enabled processor for it to work.

Hyper-Threading, by the way, exists only in the original 3.06GHz P4, and all 800MHz frontside bus processors or Pentium 4C chips.

IPOD POOPING OUT?

I was contemplating getting an iPod, but have been deterred by a rumor I heard. Is it true that the iPod's built-in rechargeable lithium-ion battery has a life expectancy of just 18 months?

—LAWRENCE SANDMAN

FEATURES EDITOR LOGAN DECKER RESPONDS: The first- and second-generation iPods used flexible lithium-polymer batteries to keep the unit small and light. One of the drawbacks of these batteries became apparent later on—many people found that after a year or so, battery life dropped dramatically. All rechargeables poop out after a while (we explained why in our Battery Guide in the July 2002 issue), but the alleged 12-18 months of battery life seems unreasonable. Note that this hasn't happened to all the original iPods. In fact, we're still using the first one we ever received. After more than two years, battery life has dropped to about 65 percent, but nothing like some of the reports we've heard.

The new, third-generation iPods use lithium-ion batteries, which are the same kind of batteries used in other high-end hard drive-based players like Creative Labs' Zen. While we do not recommend buying a used iPod, we wouldn't worry about the battery life in the new third-generation models.

WHY DO BENCHMARK SCORES FLUCTUATE?

I recently installed Windows XP on a freshly scrubbed hard drive in my system. After installation was complete, I ran *3DMark* at 1024x768x32 and got a test score of 1258. I then installed the latest mobo drivers, ran *3DMark*, and got a score of 1318. I then proceeded to disable the services listed under *Supertweak*, Black Viper's XP Services config utility. I also shut off all the fancy settings in XP under the Performance section. After running *3DMark* one more time, the score dropped to 1303. My question is this: What truly affects benchmark testing, and why did I see my scores drop after updating drivers? Along with that, why do benchmark tests change even if you run them 10x over without making any driver or performance changes?

SENIOR EDITOR GORDON MAH UNG RESPONDS: Keep in mind that you're seeing a 1 percent difference between the new drivers and the Black Viper configuration. That's well within *3DMark's* margin of error. Why are there any differences at all? I'd attribute it to the fact that Windows XP isn't a static model. Every time you boot, something will be a little different. Things may load into different parts of system RAM or data may occupy different parts of the hard disk. A 1 percent variation isn't bad at all. Furthermore, you really should look at an average of three runs for a more reliable measure. Finally, keep in mind that the Black Viper service tweaks may aid performance, but not necessarily in the particular benchmark you're using. Today, *3DMark 2001* is affected by videocard speed, CPU speed, and memory bandwidth among other things. The newer *3DMark 2003* is almost exclusively a videocard benchmark.

continued on page 8

I WASHED MY USB KEY AND IT LIVED!

Your Maximum PC USB Key Challenge (January 2004) inspired me to write about the impressive durability of my own 128MB DiskOnKey. One day, I was outside doing some yard work after I got home from my day job, and I came inside to find that the pants I had worn that day (and had left my USB key in) were not where I had left them. I asked my wife, and much to my alarm, discovered that she had thrown them in the washing machine!

By the time I got to the laundry room, the load was already done and was waiting to be put in the dryer! I rescued my USB key, but thought that it would be beyond hope. Being a little cautious, I did not test it right away. Rather, I took off the cover and laid it out on a paper towel to let it dry before testing. After a few days, I gathered enough courage to try it and stuck it in my USB port. Much to my pleasant surprise, it worked and has continued to work for the last few months.

If that doesn't suggest durability, I am not sure what does.

—SHAWN OKERSTROM

CUT, COPY, PASTE

➤ In our January 2004 review of the GeForce FX 5700 (page 84), we mistakenly listed ATI as the 3D card's manufacturer instead of nVidia (www.nvidia.com).

➤ In January's Big Bowl of Serial ATA roundup we stated that the Seagate 7200.7 Barracuda drive (page 77) included a one-year warranty. This was based on erroneous information provided by Seagate. The drive includes a three-year warranty.

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WHAT GOT YOU HOOKED?

EDITOR IN CHIEF GEORGE JONES WRITES: In my first *Maximum PC* editorial ("But First, A Little History," January 2004), I asked readers to tell us how they got hooked on personal computers. I received an avalanche of e-mail. Here's a small smattering:

What got me started? A Commodore 64. When I saw *War Games*, it galvanized and mesmerized me. I rushed to Venture (yesteryear's Wal-Mart) and, after much deliberation, choose the C64 over the VIC-20, Intellivsion, and the Radio Shack Tandy. And I never looked back. My first session with the thing was telling. I spent 16 hours nonstop on it. Only to repeat the stunt the day after that. And the day after that. Back then, I was out of work, and could only afford the computer without storage devices, not even a tape drive, so I used to type in the same programs everyday. I was my own hard drive!

—CURTIS M. HARRELL

My first experience with computers was my freshman year of high school many, many years ago. The first computer the school purchased was a good old TRS-80 Model 1 Level 1. Tape drive? Of course! And oh so slooowww. My first experience with a color game was *Space Invaders* on a black and white monitor, on which we used colored Magic Markers to add three color layers to the screen. I progressed through the TRS-80 models until the Model 3. The Commodore 64 was just released when I graduated high school and was my first computer purchase. I still have it with all the games. Some things you just can't part with.

—DAVID VENABLE

I purchased a Dell back in March 2001. After several months of running *AutoCad*, I decided to upgrade my PC with a Yamaha "Lightspeed" CD/RW drive, and then proceeded to upgrade my RAM and soundcard. With little knowledge of computers, I soon learned that I could not purchase and install just any DDR modules, nor could I simply pop in any soundcard. I couldn't even access my own BIOS to disable the onboard sound. First I got upset, then mad, and then came the March 2002 issue of *Maximum PC*. After reading the do-it-yourself articles for about a month, I decided to build my own computer, utilizing the information from *Maximum PC* and a store-bought manual. I ended up building about eight computers and selling them to small businesses and individuals.

—ROBERT SABATINI

COMING NEXT MONTH IN THE *MIGHTY, MIGHTY* MARCH ISSUE OF *MAXIMUM PC*

PENTIUM 4 PRESCOTT REVIEWED
Intel's newest CPU is in our possession. As you read this, our Lab is putting the chip through its paces. Stay tuned… next month, the result may surprise you!

MAXIMUM PC'S WIRELESS WORLD
Expert troubleshooting, unbelievably cool Wi-Fi gadgets, router reviews… what more could a power user ask for?

RAM HANDBOOK
Memory gets demystified by our RAM experts. Includes a special Maximum PC RAM Decoder that explains all the specifications and abbreviations you see in advertisements and on packaging.

PLUS: The Maximum PC Lab reviews three Athlon 64 motherboards!

WIN Rig of the Month *and Win Big!*

If your modded PC is chosen as a Rig of the Month, it will (1) be featured before all the world in *Maximum PC*, and (2) win you $1,000 and a case of BAWLS high-caffeine soft drink. So what's stopping you?

TO ENTER: Your submission packet must contain your name, street address, and daytime phone number; no fewer than three high-res JPEGs (minimum size 1024x768) of your modified PC; and a 300-word description of what your PC represents and how it was modified. E-mailed submissions should be sent to **rig@maximumpc.com**. Snail mail submissions should be sent to Rig of the Month, c/o Maximum PC, 150 North Hill Drive, Suite 40, Brisbane, CA, 94005.

The judges will be *Maximum PC* editors, and they will base their decision on the following criteria: creativity and craftsmanship.

One entry per household. Your contest entry will be valid until (1) six months after its submission or (2) May 1, 2004, whichever date is earlier. Each month a winner will be chosen from the existing pool of valid entries, and featured in the Rig of the Month department of the magazine. The final winner in this contest will be announced in the July 2004 issue. Each of the judging criteria (creativity and craftsmanship) will be weighed equally at 50 percent.

WINDOWS XP Tip Contest

READERS, IT'S TIME FOR YOU TO STEP UP

TO ENTER: Submit your finest Windows XP tip to us at **input@maximumpc.com** with the subject header: Windows Tip Contest. We'll judge the entrants and award a Creative Labs' Audigy 2 ZS to the reader who gives us the best tip and an ATI Radeon 9600 XT to second place!

The judges will be *Maximum PC* editors and they will base their decision on the following criteria: originality and overall usefulness.

One entry per individual. All entries must be received no later than February 1, 2004, with the winner being announced in the April issue of *Maximum PC*. Each of the judging criteria (overall usefulness and originality) will be weighted equally at 50%.

By entering either of these contests you agree that Future Network USA, Inc. may use your name, likeness, and web site for promotional purposes without further payment. All prizes will be awarded and no minimum number of entries is required. Prizes won by minors will be awarded to their parents or legal guardians. Future Network USA is not responsible for damages or expenses that the winners might incur as a result of the Contest or the receipt of a prize, and winners are responsible for income taxes based on the value of the prize received. A list of winners may also be obtained by sending a stamped, self-addressed envelope to Future Network USA, Inc., c/o Windows XP Tips Contest, 150 North Hill Drive, Brisbane, CA 94005. This contest is limited to residents of the United States. No purchase necessary; void in Arizona, Maryland, Vermont, Puerto Rico, and where prohibited by law.

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Imagine recording everything, including your favorite vacation videos, in about half the time. It's easy with our new True 8x™ Dual Recorder. Why? For starters, it offers 8x recording speed, the fastest available. What's more, it writes both DVD+R/RW and DVD-R/RW formats, just like its award-winning predecessor, the Dual-X DVD Recorder. And like all of our internal and external drives, it comes with everything you need to record; including a complete, easy-to-use software suite, packed with extra features. So if you're looking to record DVDs, but don't have time to burn, log onto www.memorex.com to learn more about our full line of drives and media.

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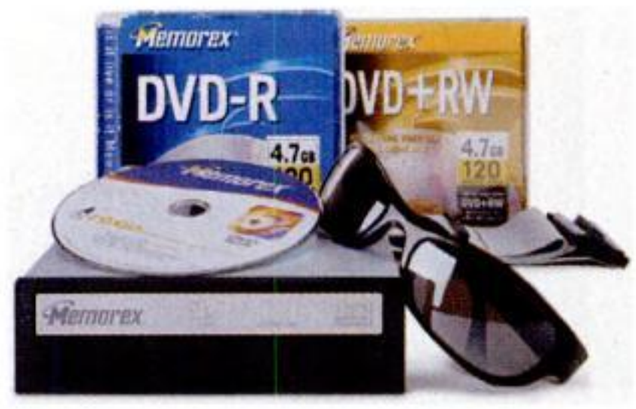

PC WORLD Best BUY

PC WORLD TOP10 DVD DRIVES

PC MAGAZINE EDITORS' CHOICE

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PC MAGAZINE (Oct 2003) and PC WORLD (Sept 2003 and Jan 2004) awards were for the Dual-X DVD Recorder.

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BOB AND SPARKY'S PRIME TIME

7:00 pm	7:30 pm	8:00 pm	9:00 pm
Digital Music Download "Yellow Dog Blues"	**TV** Watch last week's "Underdog" marathon	**Digital Photos** Upload Westminster Kennel Club Dog Show Pics & Video	**Web** Surf Kennel Club Web Board
News	**Sitcom**	**Reality Sh**	**Sporting Event**

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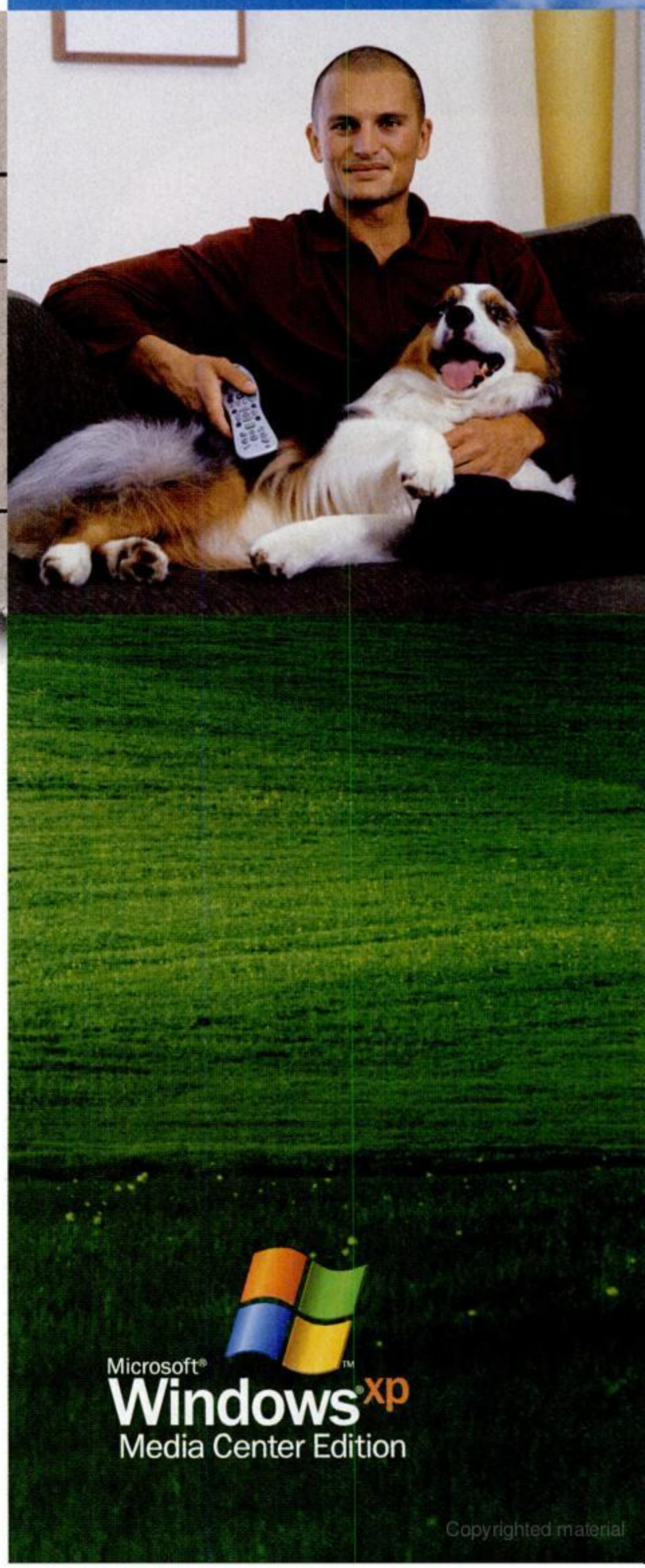
9:30 pm	10:05 pm	10:30 pm
DVD View "The New Adventures of Lassie"	**E-mail** Invite Sue & Fluffy to dog park tomorrow	**Radio** Chill to 'Dog Talk' on WOOF-FM
News	News	



Entertainment that tunes into you.

With a Windows® XP Media Center Edition PC, the programming schedule revolves around you. Pause, rewind, and digitally record your favorite TV shows. Watch your DVDs. Download, upload, and make your own music mixes, videos, and digital slideshows. The Media Center remote control lets you do it all from your favorite spot on the couch. Because it's a full Windows XP-based PC, it can also deliver your e-mail and the Web.* To experience entertainment your way, visit **microsoft.com/mediacenter** or your nearest retail store.

Microsoft® Windows® xp Media Center Edition

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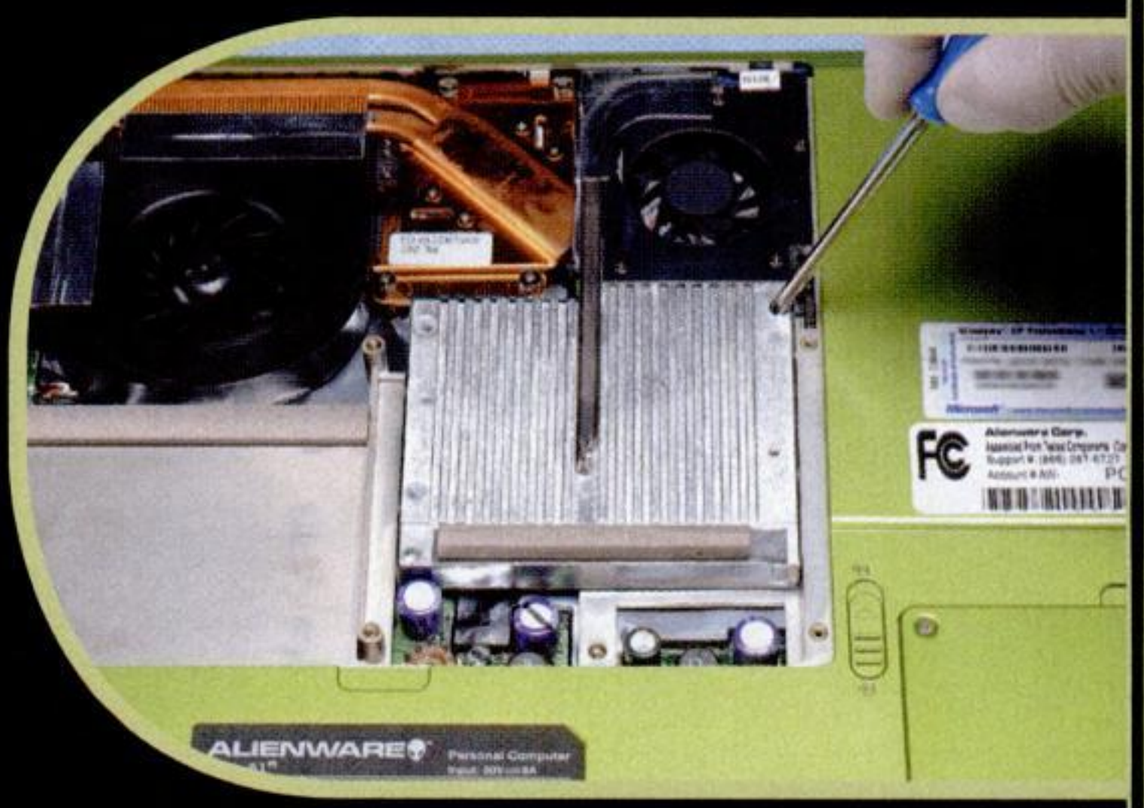
Quick Start

The beginning of the magazine, where articles are small

Alienware Autopsy
Graphics A Go Go



NO, IT'S NOT A LIVER

Documented in *Maximum PC* for the very first time: a close encounter with a previously unknown hardware type—user-upgradeable mobile graphics. Just three easily removed screws hold the module in place.

THE FIRST INCISION

Our forensics expert uses a simple Phillips head screwdriver to remove the cyborg specimen's green back panel. Who knew dissecting alien hardware could be this simple?

The photographs you see on this page aren't fakes. They're in fact very real images of an Alienware Area-51m notebook that materialized in our Lab without provocation or warning.

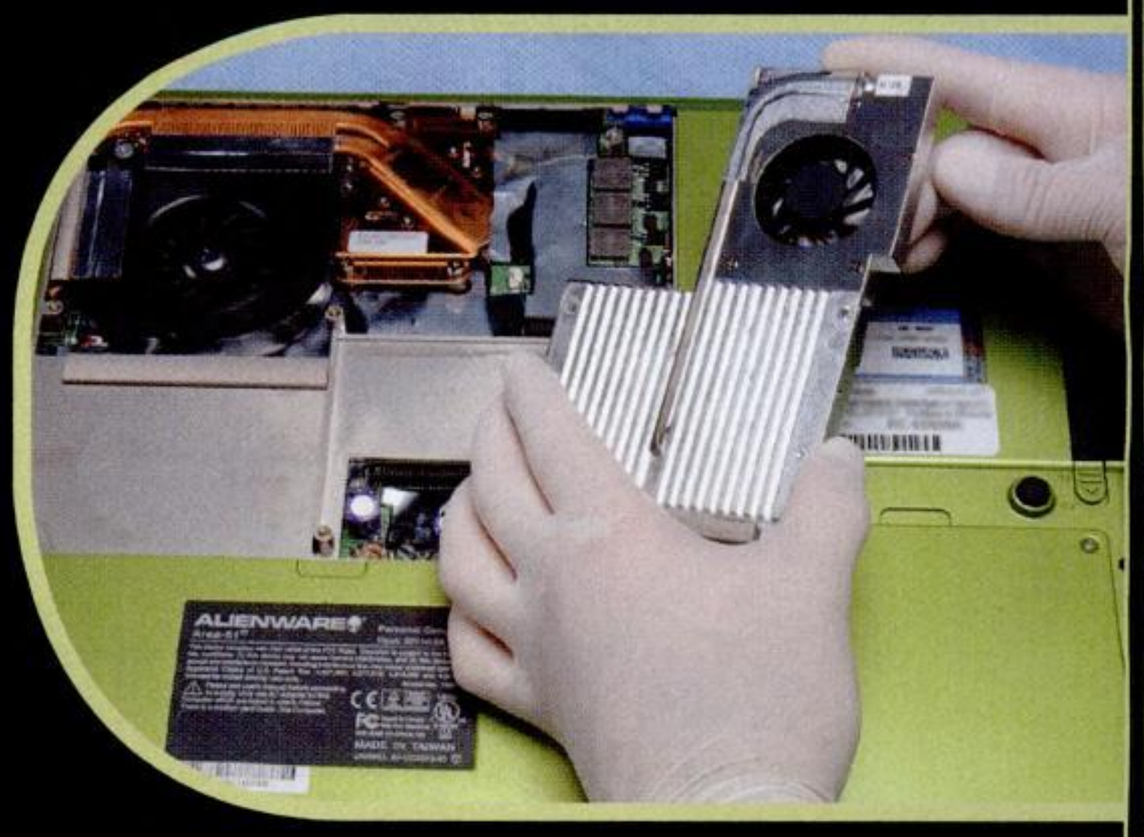
What we have here, folks, is what Alienware calls "Do-It-Yourself Upgradeable Mobile Graphics Technology." Yeah, that's quite a mouthful, but the scheme is nothing short of revolutionary. In a nutshell, the technology allows you to upgrade your notebook graphics at will—all without having to send the notebook back to its maker and suffer a possibly torturous wait time. With Alienware's new scheme, you simply undo a few screws, swap in a new graphics module, screw your notebook back together, and install new drivers. Voilà. It's done. Gone are the days when mobile graphics chips could only be upgraded by a remote support technician, or couldn't be upgraded at all.

Alienware is currently rolling out the new upgrading scheme in its high-end Area-51m Extreme, Enthusiast, and Performance models. Sometime in the future, the technology will likely extend to the company's thin-and-light Sentia models. Our notebook came with an nVidia FX Go5600 graphics module, which we promptly replaced with an ATI Mobility Radeon 9600 module ($199).

Please note that this isn't a GPU-specific breakthrough from the labs of either nVidia or ATI. It's proprietary technology developed by Alienware, which is pushing to make it an industry standard. You can switch from an nVidia module to an ATI module and back again, keeping pace with the forward march of 3D progress.

Alienware does point out, however, that DIY Upgradeable Mobile Graphics is "affected by space constraints, thermals, power requirements, and EMI considerations." So, conceivably, future mobile GPUs might simply be incompatible with Alienware's module scheme. Regardless, Alienware says it did its best to anticipate unknown compatibility hurdles when it designed its technology, and that the modules can be stuffed with different fans and heatsinks to accommodate different GPUs.

Next month, we expect to review one of Alienware's user-upgradeable notebooks. Can it beat a well-appointed Shuttle box as the ultimate LAN party rig? Check back soon for the forensics evaluation.



EASIER TO INSERT THAN AN ALIEN ANAL PROBE

Replacing the just-removed nVidia graphics module with an ATI-based module is simple: Just insert the new module, screw everything back into place, and baby's got a brand-new GPU.

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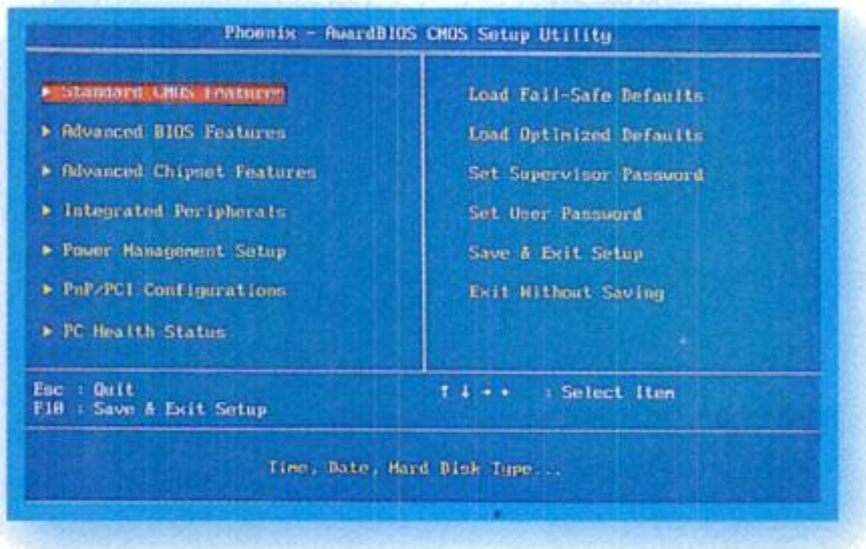
Phoenix Plots the Death of Your Bios

Two new schemes could add copy protection to your hardware

If Phoenix has its druthers, the block-text DOS BIOS will go the way of the ISA slot when the next iteration of Windows, code-named Longhorn, is released in 2006.

Phoenix is pushing for a revamping of the familiar BIOS with a modern design that will take advantage of today's high-resolution displays, support networking and remote management, be more resistant to viruses and, more ominously, could prevent you from playing songs or video that you don't own.



The familiar BIOS screen was never really loved, but power users may find themselves missing it when it's gone

Phoenix and Microsoft are both touting the Phoenix-developed Core System Software (CSS) to displace the BIOS altogether. Right now, the BIOS' main responsibilities are to configure RAM, check installed hardware for other BIOSes, and wake up the mouse and keyboard. CSS would handle all the functions of today's BIOS with the addition of a built-in TCP/IP stack, wireless support, and better support for instant-on technology.

> "IT'S ENTIRELY POSSIBLE THAT A CSS- OR EFI-EQUIPPED MACHINE COULD SAY NO WHEN YOU TRY TO PLAY A COPY-PROTECTED SONG OR VIDEO."

Intel is also pushing a plan to modernize the BIOS. Already in use with Itanium-based machines which lack the 16-bit "real" modes of 32-bit x86 CPUs, the Extensible Firmware Interface (EFI) would act as a pre-OS environment with its own high-resolution graphical user interface that sits between the BIOS and the operating system. EFI would handle such low-level tasks as initializing the chipset and busses, but also supply a set of APIs and services.

EFI also supports utilities on a special partition that would give you the ability to repartition the hard drive, make backups, or boot different OSes. Intel plans to make EFI work with legacy BIOS until companies are comfortable enough with replacing the BIOS entirely.

Although both EFI and CSS appear to be competing technologies, Phoenix says they're not. EFI is more of a middle layer between the BIOS or CSS and the OS, while CSS will replace the BIOS.

One feature the companies don't seem to want to shed much light on is the dreaded specter of built-in hardware copy protection. As part of the "trustworthy computing" model being pushed by Microsoft, both EFI and CSS have the ability to enable digital rights management (DRM) features. It's entirely possible that a CSS- or EFI-equipped machine could say no when you try to play a copy-protected song or video that you don't have the rights to. EFI supporters say those fears are unfounded. DRM isn't built into EFI; the firmware would merely activate copy protection routines on request. And Phoenix says DRM would be available on an opt-in basis. If you don't want to use DRM, you don't have to. Of course, you also won't be able to use any applications that call for the DRM to be on.

CSS is expected to be available on machines as early as this spring, while EFI probably won't come to fruition until 2006 when Longhorn becomes available.

ALT.OPINION.RANTS BY JON PHILLIPS

Why 98% of Maximum PC Readers Are Men

This column will not argue that women don't (or can't) understand computers. They can and do. *Obviously.* And this is not a column that says women don't enjoy working with computers. Some do. But the facts don't lie: Survey evidence shows us that 98 percent of *Maximum PC's* reader base is male, and I think both men and women would agree that hardcore PC enthusiasm is generally a "guy thing," anomalous female PC geeks notwithstanding. And thus the real questions emerge: Why are so few women PC fanatics, and is the status quo good, bad, or inconsequential?

Some experts tell us that women view PCs as mere tools, utilitarian devices that help them accomplish other tasks. Men, meanwhile, view PCs as toys—objects that provide their own pleasure. This tool-toy dichotomy is the by-product of numerous social influences. Well, that's the palatable explanation. The controversial explanation says the male brain is preprogrammed to view complex objects as toys to be tinkered with. The female brain is simply less inclined to derive joy from the disassembly and reassembly of intricate physical systems—or so the argument goes. Regardless, the tool-toy argument helps explain why most female computer experts are IT professionals, and very rarely PC hobbyists.

Another explanation speaks directly to the issue of how young girls and boys are taught to solve problems: Little boys are implicitly encouraged to work in groups (think Little League baseball, scouting, and even building with Lincoln Logs), while little girls don't receive the same messages. This bears fruit later on when teen girls and women encounter computer problems: They don't as frequently seek answers from others, their frustration develops its own inertia, and any budding PC enthusiasm is squashed. Think about it, guys. How many times have you turned to a fellow PC geek for help or commiseration? Women tend not to have that same support network.

Now, does any of this matter in the big scheme of what's right and wrong with the world? I don't think so. I *like* the differences between men and women, and I *like* the fact that female PC geeks are such a rare breed. (The rare is more interesting than the commonplace—it's as simple as that.) The real issue is in career growth: Women need stronger computer skills in order to keep pace with men in the competitive workspace. If they catch the PC upgrading bug during the course of their studies, awesome. But society should never encourage women to become PC geeks simply because men own that station. Our differences are awesome, and that's why I come home to a girlfriend named Jennifer, and not a *Star Wars*-loving PC geek named Gordon Mah Ung.

Jon Phillips was formerly editor-in-chief of Maximum PC, *and now serves as the magazine's editorial director.*

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The Cable to End All Cables?

HDMI consolidates the cords

This tiny USB-size plug may eventually connect all your entertainment hardware.

Over the years, we've graduated from composite video to S-video, then to component connectors, and finally to DVI with separate cables for our 5.1 surround out. Are we grateful? Oh no. While the visual quality of our picture has improved, the results behind the TV set are worse than ever.

Well, here comes HDMI. That stands for high-definition multimedia interface, and the consortium of manufacturers that developed it envision a future where it's the only cable you'll see behind the set. But wait, you ask, isn't that what DVI was supposed to do? Not really. DVI doesn't transmit audio, and as far as connectors go, it's fairly large and rather goofy.

But HDMI is in fact an extension of DVI and is fully backwards compatible with DVI signals. It uses inexpensive copper wire to transmit up to 5Gb/s, which is more than twice the bandwidth necessary for a 1080i HDTV signal, and terminates in a USB-size plug. HDMI supports compressed and uncompressed audio with up to eight channels. The specification also allows components to communicate bidirectionally, so that your DVD player can tell your TV to adjust itself for a movie with a 16:9 aspect ratio.

Of course, manufacturers aren't in a hurry to piss consumers off by making their older analog equipment obsolete, so it may be a long time before we see HDMI-only sets and hardware—perhaps not until our kids are hooking up the equipment. And will they be grateful? We doubt it.

FUN-SIZE NEWS

Hitachi's concept design for a fuel-cell powered PDA

FUEL CELLS TO LIGHT UP PDAS

Hitachi is teaming up with a Japanese cigarette lighter manufacturer to create a methanol-based fuel cell for PDAs that's expected to ship in 2005. Hitachi expects the AA-battery-size fuel cell (which contains a 20 percent solution of methanol) to power a handheld for up to eight hours.

UBISOFT RELEASES VIRTUAL-CD HATING PATCH

Gamers beware. If you update your copy of *Rainbox Six 3: Raven Shield* with patch 1.5 from publisher Ubisoft and the game refuses to run, it's probably because you've got a virtual CD application installed on your PC. If the game detects popular virtual disc mounting programs like *Daemon Tools, CloneCD, or Alcohol 120%*, it won't launch—*even if you're not using the application to run the game.*

CAREFUL—THE POPCORN GUY KNOWS KUNG FU

Under a new law that took effect January 1, 2004, movie goers may feel free to make a citizen's arrest if they spy some cretin attempting to record the movie with a camcorder. The law carries a maximum penalty of one year in jail and a $2,500 fine. The Los Angeles Police Department is graciously offering to train movie theater employees in "detention and confrontation techniques."

▶▶FAST FORWARD BY TOM R. HALFHILL

Dreaming of a Cacheless Society

Bigger caches in microprocessors are a good thing, in the same way that flu vaccines are a good thing. In an ideal world, no one would ever need a flu shot, either because there wouldn't be any influenza or our immune systems wouldn't need a performance boost. In that same world, microprocessors wouldn't need the performance boost of a cache, because memory chips wouldn't be so sickly slow.

In other words, bigger caches in microprocessors are a bad thing. They exist only to compensate for the widening mismatch between processor speed and memory speed. If DRAM chips could keep up with the processor, then the processor wouldn't need any cache at all. The processor would be smaller, cheaper, and burn less power.

I'm bringing this up because Intel recently dropped a bombshell on the high-end PC market: the Pentium 4 Extreme Edition. It's a 3.2GHz Pentium 4 with a 512K level 2 (L2) cache and a humongous 2MB level 3 (L3) cache. That's 2.5MB of high-speed memory on chip, not counting the relatively tiny level 1 (L1) cache. Intel is selling the Extreme Edition for $925, which is $288 richer than a 3.2GHz Pentium 4 without the monster L3 cache.

Hardcore gamers and other power trippers lust for the Extreme Edition. Yes, the 2MB cache does boost the performance of some programs, such as games, that crunch lots of data and follow certain program-execution patterns. With everyday productivity software, expect no difference.

Caches work by keeping frequently used program instructions and data on chip so the processor doesn't have to access the much slower off-chip DRAM as often. With 2.5MB of cache, the Extreme Edition will fool some benchmark tests that are small enough to fit entirely in the cache. The benchmark score will skyrocket because the processor never needs to access off-chip memory. Engineers call this a "perfect memory system," but it rarely reflects real-world conditions.

The Extreme Edition has 178 million transistors, compared with 55 million in a regular Pentium 4. The extra 123 million transistors are almost entirely memory. Caches are made of SRAM, which has six transistors per memory cell instead of one transistor per cell in DRAM. Do the math: 2.5MB cache = 2.56 million bytes = 20.48 million bits x 6 transistors per bit = 122.88 million transistors.

So the Extreme Edition is really an Extremely Expensive memory chip with a built-in processor. You will pay $288 for 2MB of memory. But until we achieve the ideal cacheless society, monster caches are one way to get extreme performance—but only with some software.

Tom Halfhill was formerly a senior editor for Byte *magazine and now an analyst for* Microprocessor Report.

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Lighten Up.

It wasn't so long ago that if you wanted to bring your data with you, your hardware had to come too. Well, that's all in the past now thanks to the new SanDisk Cruzer™ Mini. At under half an ounce, the Cruzer Mini goes anywhere, and with up to 256MB of flash memory, it takes a lot with it. Hi-speed USB 2.0 compliant, SanDisk's Cruzer Mini lets you transfer data faster than ever before. And at less than 8mm thick, all it needs is a single USB slot. Just drag, drop, and go. It's all about convenience – no extra hardware, no worries.

So whether you're installing utilities or updating print drivers for the umpteenth time, you can take your files with you wherever you go – and you won't even need your dolly.

For more information on SanDisk Cruzer Mini, visit www.sandisk.com/maximum

HI-SPEED USB 2.0

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DVD: The Next Generation

These are the voyages of two competing standards

We're pleased as punch to have received some of the first images of the prototype high-definition DVD player and media format known as Advanced Optical Disc (AOD), developed jointly by Toshiba and NEC. We're not so happy, however, that a confusing standards war between AOD and the competing Blu-Ray format is all but certain.

However, there's no need for panic—the new formats won't make your DVD collection obsolete. Players in both formats are expected to be backward-compatible with today's DVD-Videos. And now that the specs are nearly complete and products are beginning to ship, we can finally begin to judge the merits of these claims based on the hardware, not the hype.

BLU-RAY

Blu-Ray players are already shipping in Japan, but at $3,800, who's buying?

PROS: Blu-Ray media is encased in a cartridge slightly more than 5 inches square, which will make it much more durable than traditional DVDs. Capacities range from 23.3GB to 27GB per single-layer disc, with dual-layer discs expected in the near future doubling the capacity to 54GB per disc! A single-layer Blu-Ray disc can record up to two hours of HDTV using MPEG-2 compression at a maximum data rate of 36Mb/s. The standard boasts massive industry support from tech heavies including Hitachi, Sony, Philips, and Pioneer.

CONS: Manufacturing facilities must be overhauled to produce the new discs, which adds a significant amount to the cost, and chunky 7mm thick cartridges limit how small the players can be. And isn't MPEG-2 getting a little long in the tooth?

ADVANCED OPTICAL DISC

PROS: AOD uses the same optical pick-up used in current players, and existing DVD plants can churn out the new media with only slight alterations in the manufacturing process. This will translate into much cheaper hardware and lower media costs, as well as smaller players (thanks to the cartridge-less design). Dual-layer discs can hold up to 30GB per disc, but the use of advanced H.264 compression—a variant of MPEG-4 compression—means that AOD will be able to pack approximately two to three times more video in the same amount of disc space.

AOD is the dark horse candidate for next-gen video, but being a lot cheaper can go a long way.

CONS: Toshiba and NEC stand alone against the Blu-Ray gang, which doesn't bode well for the format. AOD isn't scheduled to be officially ratified until later this year, meaning shipping products will come much later. Maybe too much later.

The PC Prevails

There was something slightly perverse—and telling—about *Knights of the Old Republic* (reviewed on page 70) making its debut on the Xbox. For years, PC gamers have been able to claim deep strategy games, first-person shooters, and classic role-playing games as our own unique turf. Console gamers may have been treated to variations on these themes, but the PC dominated them. After all, consoles still can't adequately mimic the keyboard/mouse control scheme best suited for the FPS, and any strategy game beyond the simplest RTS becomes a burden once untethered from the desktop. And, while role-playing games have long been a staple on console systems, the genre on those platforms has evolved a style of its own.

So, when BioWare, a company famous for PC game design, debuted *Star Wars: Knights of the Old Republic* on the Xbox—new engine, *Star Wars* license, and all—PC gamers were reasonably peevish. Hearing Xbox gamers endlessly gush about *Knights'* remarkably satisfying evocation of the rough-and-tumble early days of the Jedi and Sith, and not being able to play it must have made more than one PC gamer contemplate our platform's fate. Among the faithful, suspicion already exists that, as a popular gaming format, PC is falling somewhere between N-Gage and The Lynx. *Knights'* July release on Xbox and November PC date didn't do much to change that.

What a surprise it is then to load up BioWare's PC version of the game and find that it's, indeed, not only the best PC RPG of the year, but superior in every way to the console version. The box specs will make even stout hearts quail, with its minimum Windows XP system specs of a PIII 1GHz, 256MB RAM, 4GB hard drive space, and 32MB OpenGL card. These specs are no joke. *Knights* looks significantly better on PC than on Xbox (with more detailed landscapes and 1600x1200 resolution), but will smoke all but the best systems.

I've played both versions, and it's clear that *Knights* was always meant to be a PC game. It not only looks and plays better on PC, it just *feels* better. This is partly because BioWare took the time to retool the interface, include new objects, and add a new location, but also because the complexities of RPGs demand the expanded control possibilities of the PC. *Knights* certainly debuted on Xbox for financial reasons, but it's finally come home to the PC, where it always belonged.

Tom McDonald has been covering games for countless magazines and newspapers for years. He lives in the New Jersey Pine Barrens.

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Thousands of Possibilities
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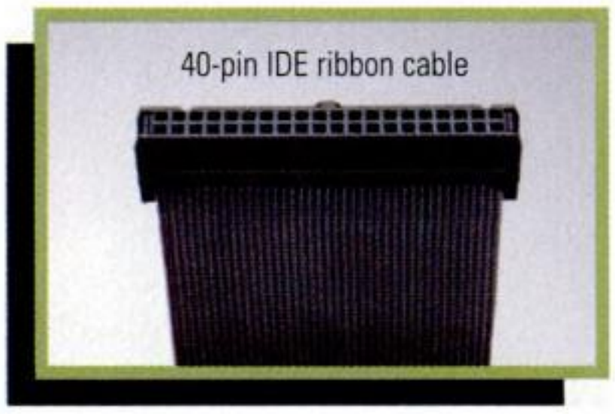
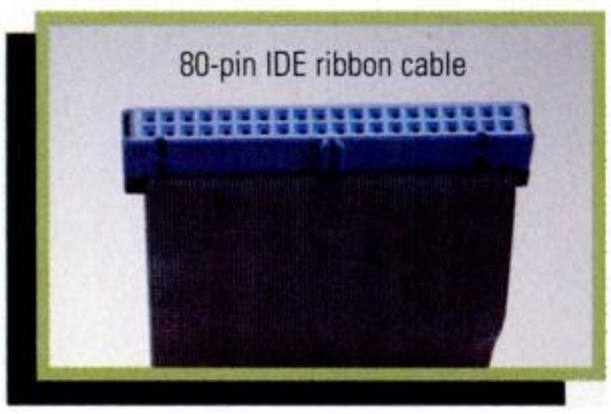
The Maximum PC Plug 'n' Connector Reference

A visual tour of your PC's ins and outs

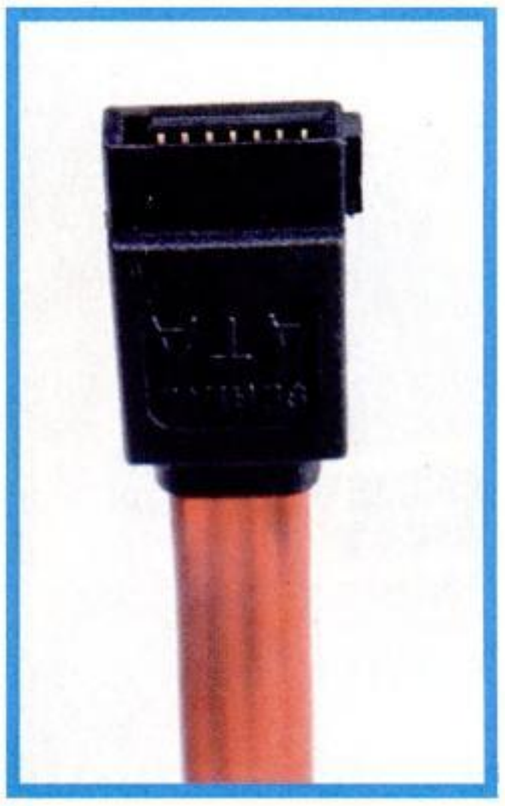
Computers are so ubiquitous these days that it's only a matter of time before you see a FireWire 800 cable as a visual Daily Double on *Jeopardy*! Don't be the laughingstock of the country by blowing an easy one like that on national television. Check out our guide to the most essential plugs and connectors in today's PCs, put on a nice suit, and hit the buzzer with confidence and pride.





IDE (integrated drive electronics)

The hoary standard for hard drives, Zip drives, and opticals
Bandwidth: Up to 133MB/s



Serial ATA

Next-gen connector for hard drives, and soon optical drives as well

Bandwidth: 150MB/s
Connector: 4-pin data cable

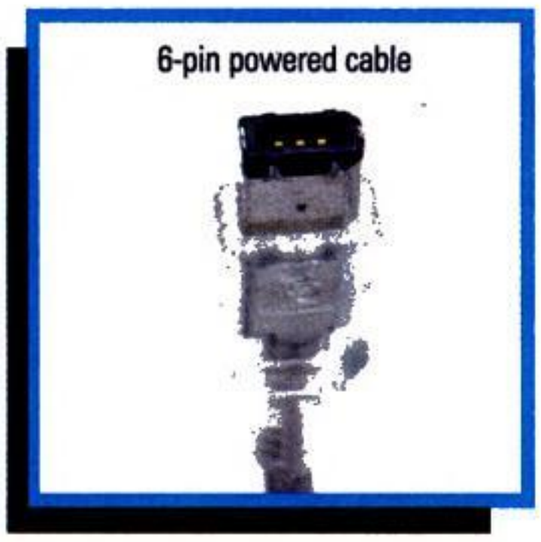
Serial (RS-232)

Medieval port used for modems and old handhelds

Bandwidth: 115.2Kb/s; 230.4Kb/s (high-speed)
Connector: DB9

USB (universal serial bus), USB 1.1, USB 2.0

Bandwidth: 1.5Mb/s (USB 1.1), 12Mb/s (USB 1.1), 480Mb/s (USB 2.0)



FireWire (IEEE 1394a)

Standard for linking DV cameras and high-speed peripherals

Bandwidth: 400Mb/s

Note: External FireWire devices that use the small 4-pin unpowered jack will require a separate power source.

Parallel (IEEE 1284)

Once the standard for external peripherals and printers

Bandwidth: 2MB/s
Connector: DB25

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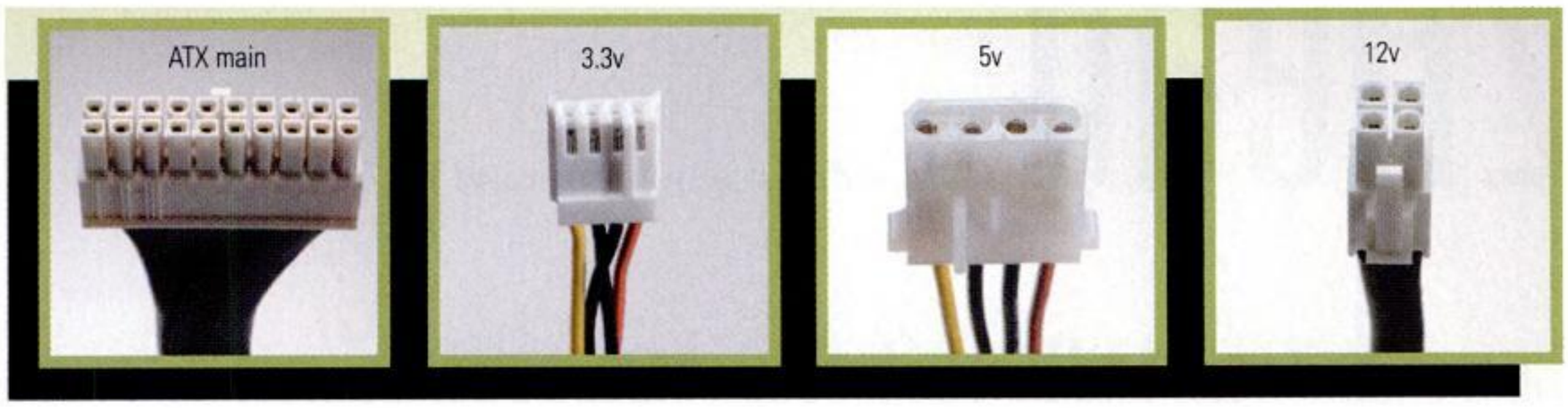


Power Supply (3.3v, 5v, 12v)

Enables transition of PC and components from "off" state to "on" state

DVI (digital visual interface)

For connecting digital displays (LCDs)
Connector: 20-pin DVI-D or DVI-I cable

VGA (video graphics adapter)

For connecting analog displays (CRTs)
Connector: DB15 15-pin VGA connector

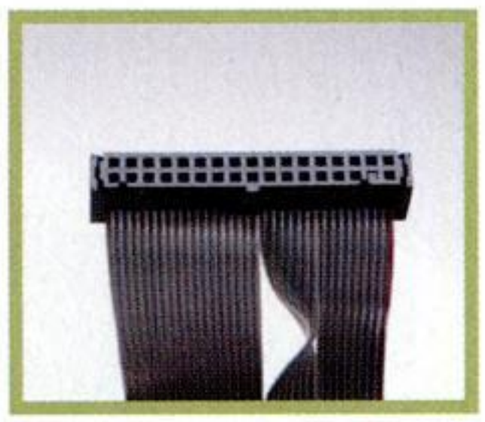
FireWire 800 (IEEE 1394b)

Doubles the data rate of the original FireWire spec

Bandwidth: 800Mb/s
Connector: 9-pin cable

CD Audio/SPDIF (Sony/Philips digital interface)

Obsolete connection for digital audio (replaced by digital audio through the parallel connection)
Connector: 2- or 4-pin cable



Floppy

Ye Olde Floppy Drive

Bandwidth: Up to 1Mb/s
Connector: 34-pin ribbon cable

Ethernet

Tipper invented this networking protocol while Al was busy with the Internet

Bandwidth: 10Mb/s, up to 1Gb/s for Gigabit Ethernet
Connector: RJ45 connectors (that's telephone cables, folks)

CardBus

The 32-bit CardBus replaced the 16-bit PC Card (PCMCIA) bus for connecting peripherals to laptops

Bandwidth: 133MB/s
Connector: 68-pin connector

Note: Never try to force a CardBus peripheral into the slot; a difficult entry may mean the card is an older PC Card that has different power requirements than what your laptop may require. Check the documentation!

Copyrighted material

Head2Head

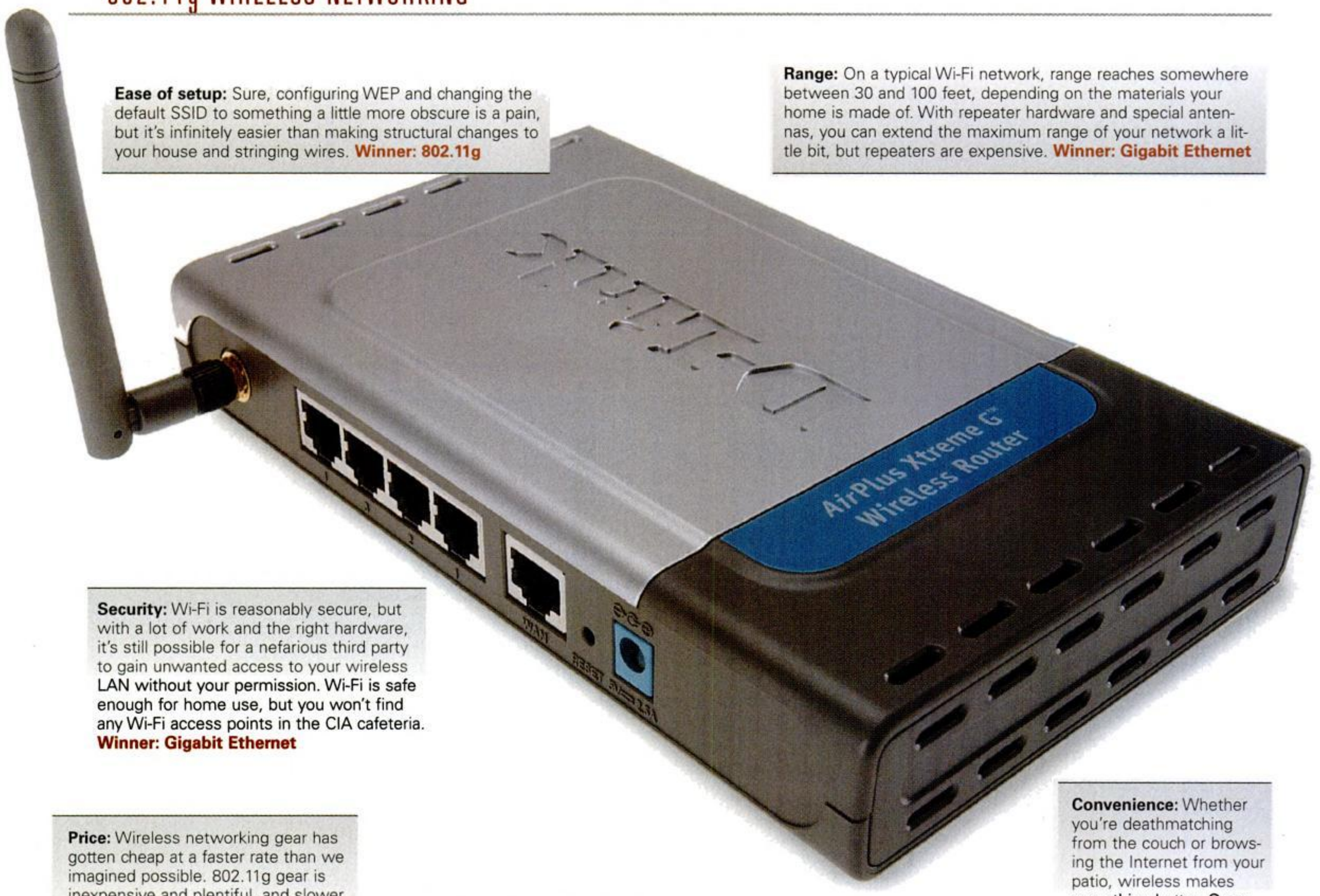
A showdown among natural PC competitors

THIS MONTH: Wired vs. Wireless!

On one hand you have convenience. Setting up a wireless network is easy. Provide power, take five minutes to configure your access point, and you should be up and running. On the other hand, there's speed. In real-world situations, Gigabit Ethernet is more than 20 times faster than an 802.11g wireless LAN. But you have to run cables to every computer in your home. How do the pros and cons of each technology stack up? What's the best solution for you?

—WILL SMITH

802.11g WIRELESS NETWORKING



Ease of setup: Sure, configuring WEP and changing the default SSID to something a little more obscure is a pain, but it's infinitely easier than making structural changes to your house and stringing wires. **Winner: 802.11g**

Range: On a typical Wi-Fi network, range reaches somewhere between 30 and 100 feet, depending on the materials your home is made of. With repeater hardware and special antennas, you can extend the maximum range of your network a little bit, but repeaters are expensive. **Winner: Gigabit Ethernet**

Security: Wi-Fi is reasonably secure, but with a lot of work and the right hardware, it's still possible for a nefarious third party to gain unwanted access to your wireless LAN without your permission. Wi-Fi is safe enough for home use, but you won't find any Wi-Fi access points in the CIA cafeteria. **Winner: Gigabit Ethernet**

Price: Wireless networking gear has gotten cheap at a faster rate than we imagined possible. 802.11g gear is inexpensive and plentiful, and slower 802.11b gear can be found at bargain basement prices. The street price for an 802.11g access point/router/switch combo is less than $100 now, and you can easily connect a dozen clients to one access point. **Winner: 802.11g**

Speed: Taking the time to run CAT5 cables to all your PCs pays off when you're transferring large files. 802.11g has a maximum theoretical bandwidth of 54Mb/s, but in the real world, much of the available bandwidth is unavailable to users. Instead it's used up by basic network housekeeping chores. Gamers should be especially wary of wireless networks—their increased overhead can greatly affect both your ping and packet loss. **Winner: Gigabit Ethernet**

Convenience: Whether you're deathmatching from the couch or browsing the Internet from your patio, wireless makes everything better. Once you've browsed the net from a notebook in your bed, you'll never want to jack into an Ethernet cable again. **Winner: 802.11g**

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GIGABIT WIRED NETWORKS

Ease of setup: Properly installing a wired network can involve knocking holes in walls, mucking around in your crawlspace and attic, or wiring patch panels. Configuring a wireless LAN is much easier than running CAT5 cable through your house. **Winner: 802.11g**

Security: Not much is more secure than a network you have to physically connect a cable to in order to transfer data. Sure, if someone breaks into your house they can compromise your network, but if the NSA or the Mob is after you, you're boned no matter what. **Winner: Gigabit Ethernet**

Range: Do you want to connect two PCs on either end of a football field? Just get a 100-yard Ethernet cable and connect the PCs to a hub. If you need to extend your LAN beyond 100 meters, you can use inexpensive repeaters and more than double your maximum cable run. **Winner: Gigabit Ethernet**

Price: Gigabit is still relatively new, which means it's more expensive than older technology. Small Gigabit switches with eight ports or fewer generally cost about $20 per port. In addition to the hub, you also need to purchase enough CAT5 cable to reach each computer you want to network. And to get maximum speed from each machine, you'll need a Gigabit Ethernet card in each PC. Total cost for a four-machine Gigabit Ethernet network could run upwards of $500. **Winner: 802.11g**

Speed: Gigabit Ethernet's 20-fold theoretical bandwidth advantage is expanded even further in real world tests. Without pesky interference to deal with, Gigabit Ethernet uses more of the theoretical maximum bandwidth for data transfers and less for housekeeping duties. **Winner: Gigabit Ethernet**

Convenience: Anywhere you want to be connected to your network, you'll also be tethered to an annoying cable. Wireless wins the convenience round without a fight. **Winner: 802.11g**

THE UPSHOT

What's the best wireless networking standard for you? It really depends on what you use your network for. Gamers and anyone who frequently transfers large files will probably benefit from the greater speed of a Gigabit network. However, if you just use your network to share a broadband connection, a Wi-Fi setup has more than enough available bandwidth to accommodate Internet connection sharing, so there's no reason to wire your home.

Instead of choosing one technology or the other, many power users have complementary wired and wireless networks. Nothing beats the convenience of browsing the net on a wireless equipped laptop, but there's no reason to cripple your file transfer rates and kill your ping times so you can cruise the net from your couch. ■

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AHEAD OF THE GAME

AREA-51™

The way it's meant to be played

NVIDIA.

AREA-51™ EXTREME OPTION

Exclusive Alienware® Chassis with 420-Watt PSU
Intel® Pentium® 4 Processor with HT Technology Extreme Edition 3.20GHz
Advanced 800MHz System Bus with 2MB L3 and 512KB L2 Cache
High-Performance Heatsink-Cooling System
Intel® 875P Chipset-Based Motherboard
1024MB Corsair XMS Dual-Channel PC-3200 DDR SDRAM at 400MHz
NEW! Alienware® Extreme Edition GeForce™ FX 5950 Ultra 256MB at 510MHz
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500GB 7200RPM Serial ATA-150 RAID 0 Array 16MB Cache
Creative Sound Blaster® Audigy 2™ ZS Platinum Pro 7.1 Advanced 24-bit Audio
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Black Plextor® PX-708A 8X DVD±R/RW Drive
Alienware® 16MB USB 2.0 Flash Drive
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Alienware® Black IntelliMouse Explorer 3.0 by Microsoft®
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Intel® Pentium® 4 Processor with HT Technology 2.80GHz
Advanced 800MHz System Bus with 512KB L2 Cache
512MB Corsair XMS Dual-Channel PC-3200 DDR SDRAM at 400MHz
NVIDIA® GeForce™ FX 5200 Ultra 128MB with DVI and S-Video Out
80GB 7200RPM Serial ATA-150 Hard Drive 8MB Cache
Creative Sound Blaster® Audigy 2™ 6.1
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Area-51 Desktop Gaming

Custom-built and optimized for high-performance PC gaming, the Alienware Area-51 incorporates state-of-the-art components to enable the highest possible levels of image and sound quality-all without sacrificing ultra-smooth game-play. The Area-51 offers the perfect combination of power, performance, and style. Backed by award-winning customer support, the Area-51 delivers the ultimate gaming experience.

Award(s) and quote(s) listed do not pertain to a specific system or configuration. Prices, configurations, and availability may change without notice. Taxes and shipping charges not shown. Alienware can not be held responsible for errors in photography or typography. For complete information on warranty, support, and on-site or depot service, visit www.alienware.com. For hard drives, GB means 1 billion bytes and accessible capacity may vary depending on configuration. For CD-ROM, DVD-ROM, CD-RW, and DVD+RW/+R drive(s), maximum data transfer rates may vary and discs created with these drives may not be compatible with all drives and players. For modems and network cards/hardware, maximum achievable data transfer rates may vary. Actual case may vary in design. Alienware and the Alienware logo are registered trademarks and trademarks of Alienware Corporation. All registered trademarks and trademarks are the property of their respective owners. (1) This applies only to purchases made direct with Alienware and shipping within the U.S., except for those shipping to Florida. Corporate purchases are not exempt from use taxes within their own states. Orders shipping to Florida must pay all state and local sales taxes. (2) Subject to credit approval. Terms subject to change without notice. See agreement for complete information. Annual Percentage Rate: 21.90%. Minimum finance charge: $1.00. (3) Same configuration as extreme option, but with the changes listed. (4) Chassis refers to the internal chassis and not to the entire external case.

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"Incredible pricing, no-excuses performance, and unforgettable design aesthetic."

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MAXIMUM PC KICK ASS PRODUCT

AREA-51m™ EXTREME OPTION

Exclusive Alienware® Case with Magnesium Alloy Chassis[4]
Intel® Pentium® 4 Processor at 3.20GHz
Advanced 800MHz FSB and 512KB Advanced Transfer Cache
SiS® 648FX Chipset Motherboard with AGP 8X
1024MB PC-3200 DDR SDRAM
60GB 7200RPM Ultra ATA100 Hard Drive 8MB Cache
Removable 16X/2X CD-RW/DVD-RW Combo Drive
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NEW! NVIDIA® GeForce™ FX Go5700 128MB DDR
NEW! Do-It-Yourself Upgradeable Mobile Video Card Design
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Three USB 2.0 Ports and One Firewire IEEE 1394 Port
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ACCESSID: MPC0204SM3

Area-51m Mobile Gaming

The Area-51m takes mobile gaming to the next level with innovative features like a Do-It-Yourself Upgradeable Mobile Video Card and optional built-in 802.11a+b+g wireless networking technology. Performance is better than ever with the availability of processors up to 3.20GHz, and the capacity for up to 2GB of PC-3200 memory. Backed by award-winning customer support, the Area-51m delivers the ultimate mobile gaming experience.

AREA-51m™ PERFORMANCE OPTION[3]

Exclusive Alienware® Case with Magnesium Alloy Chassis[4]
Intel® Pentium® 4 Processor at 2.80GHz
Advanced 800MHz FSB and 512KB Advanced Transfer Cache
512MB PC-3200 DDR SDRAM
40GB 5400RPM Ultra ATA100 Hard Drive 8MB Cache
Removable 8X DVD-ROM Drive
15.4" WideSXGA+ TFT Active Matrix LCD
NEW! NVIDIA® GeForce™ FX Go5700 128MB DDR
NEW! Do-It-Yourself Upgradeable Mobile Video Card Design

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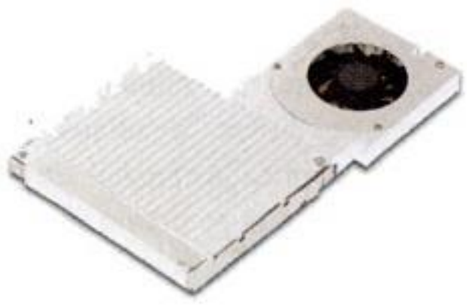
Do-It-Yourself Upgradeable Mobile Video Card Design



The innovative Area-51m overcomes the technology barrier that has faced mobile gamers for years: graphics upgradeability. The Area-51m now features a Do-It-Yourself Upgradeable Mobile Video Card, allowing you to extend the life of your mobile gaming system. This feature works similar to a desktop video card, giving you the freedom to upgrade your system when new technology becomes available.

NOW FEATURING THE NEW
NVIDIA® GeForce™ FX Go5700
WITH CINEMATIC GRAPHICS AND DIRECTX 9 SUPPORT

The way it's meant to be played — NVIDIA

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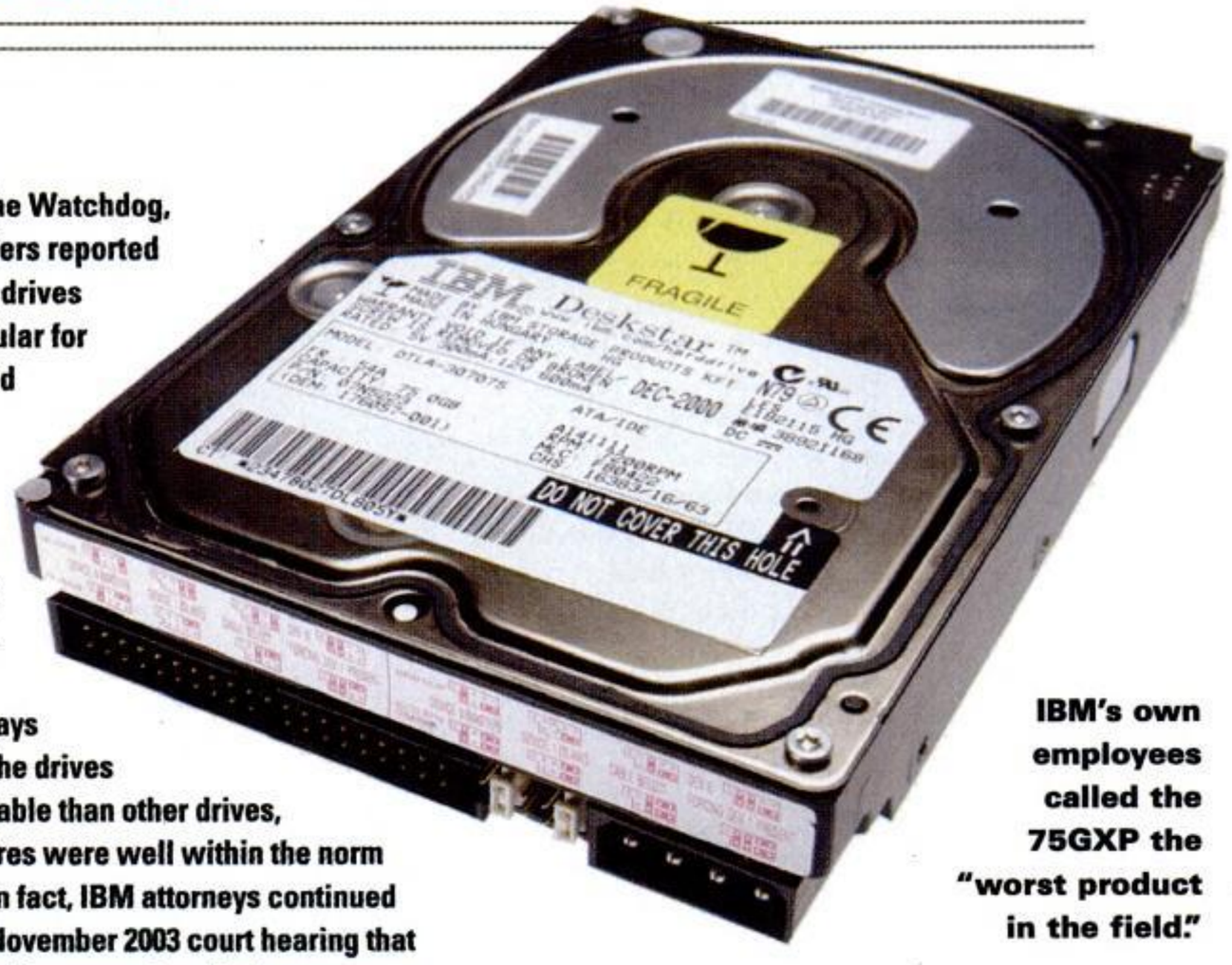
WatchDog

Say hello to **Trudy**, WatchDog of the Month.

Maximum PC takes a bite out of bad gear

THIS MONTH: The WatchDog goes after...
>IBM Deskstar 75GXP Hard Drives



IBM's own employees called the 75GXP the "worst product in the field."

Watchdog Special Report

The Latest on the IBM 75GXP Lawsuit

While IBM publicly conveyed that nothing was amiss with its 75GXP hard drives, confidential e-mail and documents reviewed by *Maximum PC* show IBM employees in a near panic over the problem, grappling to find the cause and even calling the now infamous drive the "worst product in the field."

The e-mails all seem to contradict IBM's public stance that the 75GXP drive had no reliability problems; one e-mail even details an exec ordering that drives rejected by one vendor because of reliability issues be sold elsewhere without anything done to correct them.

In another e-mail exchange, an employee in IBM's Hong Kong office pleads with superiors to address the problem instead of trying to patch it with a public relations campaign.

"This is impacting our sales-out severely. The Corp. instruction is about communication to customers—not instruction in fixing the problem," the employee writes. "Sending highly defective product back into the channel did not help fix anything. Now bad-mouthing about IBM HDD is all over the market. We (must) start to do something to solve this. Distributors are rejecting this due to severe quality concerns—not business."

An IBM manager agreed that the failure rate was "beyond normal" but refused to replace all of a customer's hard drives as they were beyond the warranty period.

The confidential e-mail, depositions, and documents were unsealed last month in a California court as part of an ongoing class-action suit against IBM. The e-mails appear to show IBM in disarray over the problem, deceiving Compaq and deciding to sell drives that were rejected by one OEM to end users without any corrective actions taken.

Filed by Philadelphia firm Sheller, Ludwig & Badey, the class-action lawsuit alleges that IBM knowingly sold defective drives to consumers, and that the company never warned its customers that the drives were essentially ticking time bombs capable of destroying users' data. In response to a query from the Watchdog, hundreds of readers reported failures with the drives which were popular for their capacity and performance. *Maximum PC* reader Michael Granito was the first to file a suit after he had several drives fail.

IBM has always maintained that the drives were no less reliable than other drives, and that the failures were well within the norm for the industry. In fact, IBM attorneys continued to maintain in a November 2003 court hearing that the problem is nothing more than high return rates by OEMs and distributors who couldn't sell drives, and by the consumers themselves who incorrectly installed the drives or overclocked their machines.

"These failures can be attributed to a lot of sources, but we don't think they can be attributed to IBM," an attorney for IBM told the judge who was considering whether to let the suit proceed. Company officials reached by the Dog declined to comment because of the pending litigation, but did say the suit was without merit. IBM sold its ailing hard drive division to Hitachi in 2002 but maintains a 30 percent ownership.

> *"THESE FAILURES CAN BE ATTRIBUTED TO A LOT OF SOURCES, BUT WE DON'T THINK THEY CAN BE ATTRIBUTED TO IBM."*

The internal e-mails and depositions of IBM employees, however, seem to contradict what the company has publicly stated and what its lawyers maintain.

Documents in the lawsuit show that 30 percent of consumers who received replacement drives for dead drives had the new units fail as well. Another document says some 11.3 million drives in the Telesto family were sold, including 4.1 million 5,400rpm drives (a majority of complaints the Dog received were about the 7,200rpm versions). The IBM documents show that the 5,400rpm drives had return rates of 1.76 percent and were classified as low risk drives. The 15GB, 30GB, and 45GB 7,200rpm 75GXP drives had return rates of 4.4 percent and were classified as low to moderate risk. Meanwhile, the 60GB and 75GB drives had 6.5 percent return rates and were deemed a moderate to high risk. Failure rates for some drive customers far exceeded 6.5 percent though, according to IBM documents.

In one e-mail exchange with Quantum, which integrated the 75GXP drives into its Snap servers, an IBM employee dejectedly sums up the problem: "Basically in the new system (Snap 12000), IBM Telesto 75GB in a side-by-side qual test comparison with Maxtor 80GB finished with a dismal 10,000 DPPM, while Maxtor ran at 1,000 DPPM. I told the group that even with a microcode revision and screening, we probably cannot achieve a 1,000 DPPM," the IBM employee writes.

The situation became so bad that a Quantum executive chastised IBM in an e-mail.

"While we appreciate that you have analyzed these failures and categorized them for us, we are extremely disappointed that you would ship a product with this known level of defects," a Quantum executive wrote to IBM. "You might recall that we had issues with the 60GB version of this product in October 2000. We were given assurances that you had corrected the defects found in your process. We now have fact-based reason to believe that the high

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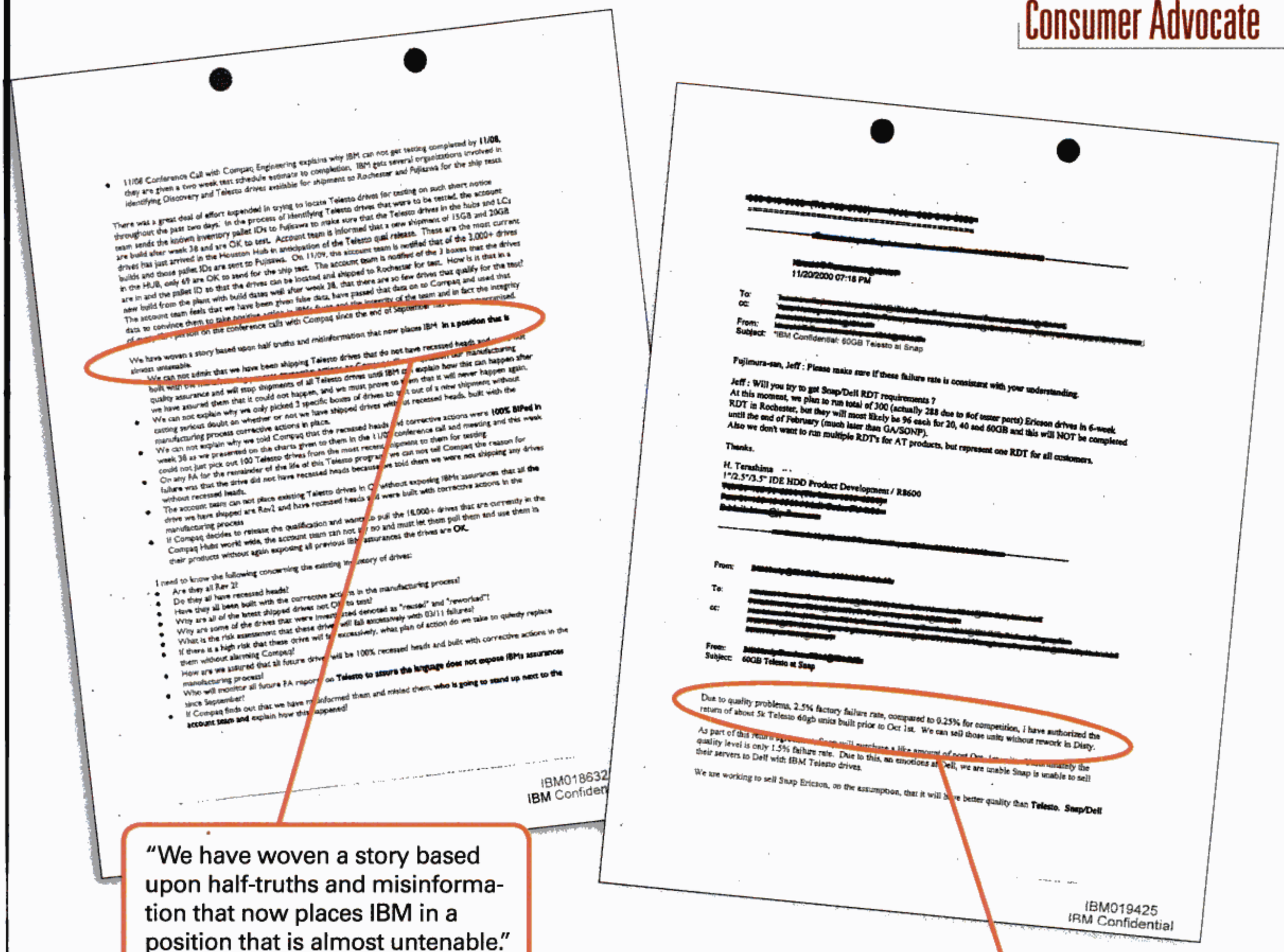

"We have woven a story based upon half-truths and misinformation that now places IBM in a position that is almost untenable."

"Due to quality problems, 2.5% factory failure rate, compared to 0.25% for competition, I have authorized the return of about 5K Telesto 60GB units built prior to Oct. 1. We can sell those units without rework in Disty."

defect rates we have experienced in this product are directly attributable to another series of defects in your drives."

Quantum ultimately was able to return 800 hard drives to IBM, but more troubling is an e-mail that seems to show that IBM was unable to even distinguish newer generations of the drive, called the "Rev 2," from older ones. The inability to track the older generation from newer generation helped put the kibosh on an 18,000 drive order from Compaq.

"The account team feels that we have been given false data, have passed the data on to Compaq, and used that data to convince them to take positive action in IBM's favor, and the integrity of the team and in fact the integrity of every IBM person on the conference calls with Compaq since the end of September has been compromised," one alarmed sales manager wrote to IBM execs about problems trying to get the drive qualified for Compaq. "If Compaq finds out that we have misinformed them and misled them, who is going to stand up next to the account team and explain how this happened? I feel we are at great risk. This program and future programs are at great risk."

One issue never actually resolved in the documents is the actual cause of the problem. Some of the problems stemmed from a bug in Windows 98 that created a false bad sector when the OS shut down before the write cache in the hard drive could be flushed. But there are also clear indications of manufacturing problems—something IBM has long denied. In the documents discussing a qualification for a Compaq contract, IBM speaks of a "Rev 2" model with a recessed head, newer firmware, an improved manufacturing process to reduce "contamination," and better quality assurance. IBM's promise of the improved Rev 2 convinced Compaq to continue using the drive, but when IBM exhibited difficulties in tracking whether the drives were Rev 2 or Rev 1, IBM sales reps became alarmed and triggered an e-mail exchange that admits to misleading Compaq.

In another potentially damning e-mail, an IBM exec seems to suggest selling the hard drives that were rejected by a company to distribution, which meant a majority would end up in the hands of consumers.

"Due to quality problems, 2.5 percent factory failure rate, compared with 0.25 percent for competition," the IBM exec writes, "I have authorized the return of about 5K Telesto 60GB units built prior to Oct. 1. We can sell those units without rework in Disty." ■

"IF COMPAQ FINDS OUT THAT WE HAVE MISINFORMED THEM AND MISLED THEM, WHO IS GOING TO STAND UP NEXT TO THE ACCOUNT TEAM AND EXPLAIN HOW THIS HAPPENED?"

Got a bone to pick with a vendor? Been spiked by a fly-by-night operation? Sic The Dog on them by writing **watchdog@maximumpc.com**. The Dog promises to get to as many letters as possible, but only has four paws to work with.

Energize Windows!

Maximum PC presents a slew of expert tips that will help you transform Windows XP into a faster, stronger, leaner operating system

WARNING:

Maximum PC's Windows tips induce more powerful, speedier responses than other magazines' tips. *Maximum PC's* Windows tips may result in spontaneous bursts of excitement and unprecedented levels of productivity.

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The competition always asks us, "How do you come up with so many useful tips?" The answer is *Maximum PC's* top-secret, no-BS, triple-filtering process, which analyzes each tip with constantly changing, proprietary criteria in mind.

This year's criteria: High-end speed, power, and efficiency. Desktop resizing tips? Out! That's so yesterday. Different desktop images on each of your dual displays? In! That's the kind of forward-thinking, *Maximum PC*-type of tip we like.

So kick back and crack open our refreshing, hand-distilled can o' tips.

SATISFACTION GUARANTEED!

Speed Up Windows

Administer a few tweaks and even the best behaved XP box will move faster

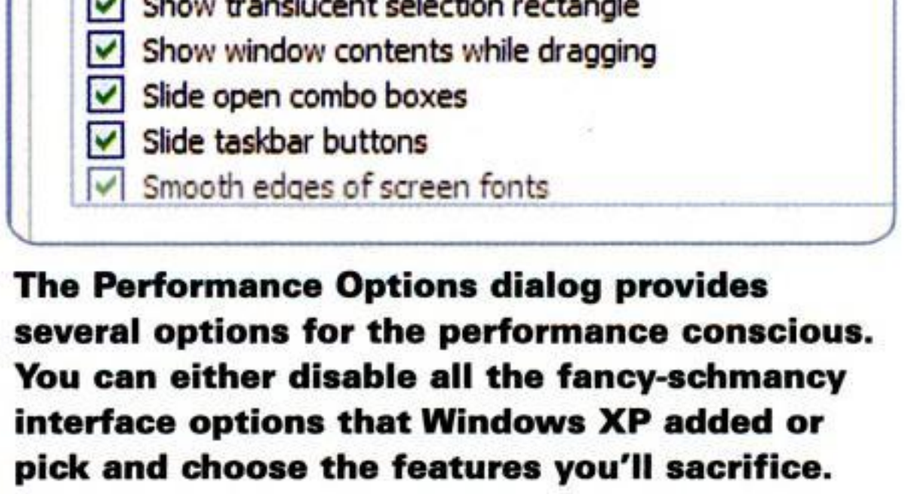
GET THE LATEST DRIVERS

There's a reason we mention this every time we dole out Windows tips: It should *always* be your starting point. Getting the latest drivers for your hardware can give you a big performance boost and make your PC more stable at the same time. You don't need to update drivers for all the hardware in your machine, just the crucial components. We recommend you update your videocard, motherboard chipset, and soundcard drivers regularly, but drivers for your mouse, keyboard, and other USB devices need to be updated only when you experience problems.

DISABLE WINDOWS' BELLS AND WHISTLES

Windows XP is the best looking OS from Microsoft to date, but those good looks aren't free. The fancy new UI, drop shadows, and other adornments can negatively impact your PC's performance. Luckily, these features are easy to disable.

- **First, go to System Properties** by pressing the Windows key and Pause/Break. Go to the Advanced tab, and press the Settings button in the Performance section.
- **On the Visual Effects** tab of the Performance dialog (see image) change the setting to "Adjust for Best Performance." You can also pick and choose your settings by using the Custom option if you prefer. When you're done, press OK, and close System Properties.
- **Now cruise over to** Display Properties by right-clicking an open area of your Desktop and clicking Properties. Go to the Appearance tab, then click Effects. For best performance, make sure all the options here are unchecked.
- **Drawing a bunch of icons on** your Desktop can impact performance, especially if you have a lot of real estate with a multi-monitor display. If you'd rather take a solid kick to the groin than clean up the unneeded icons, you can sweep them under the rug simply and easily. Just right-click an open area of your Desktop, go to Arrange Icons, and uncheck "Show Desktop Icons." Voilà, your problem is solved!



The Performance Options dialog provides several options for the performance conscious. You can either disable all the fancy-schmancy interface options that Windows XP added or pick and choose the features you'll sacrifice.

Illustration by Oliver Wolfson

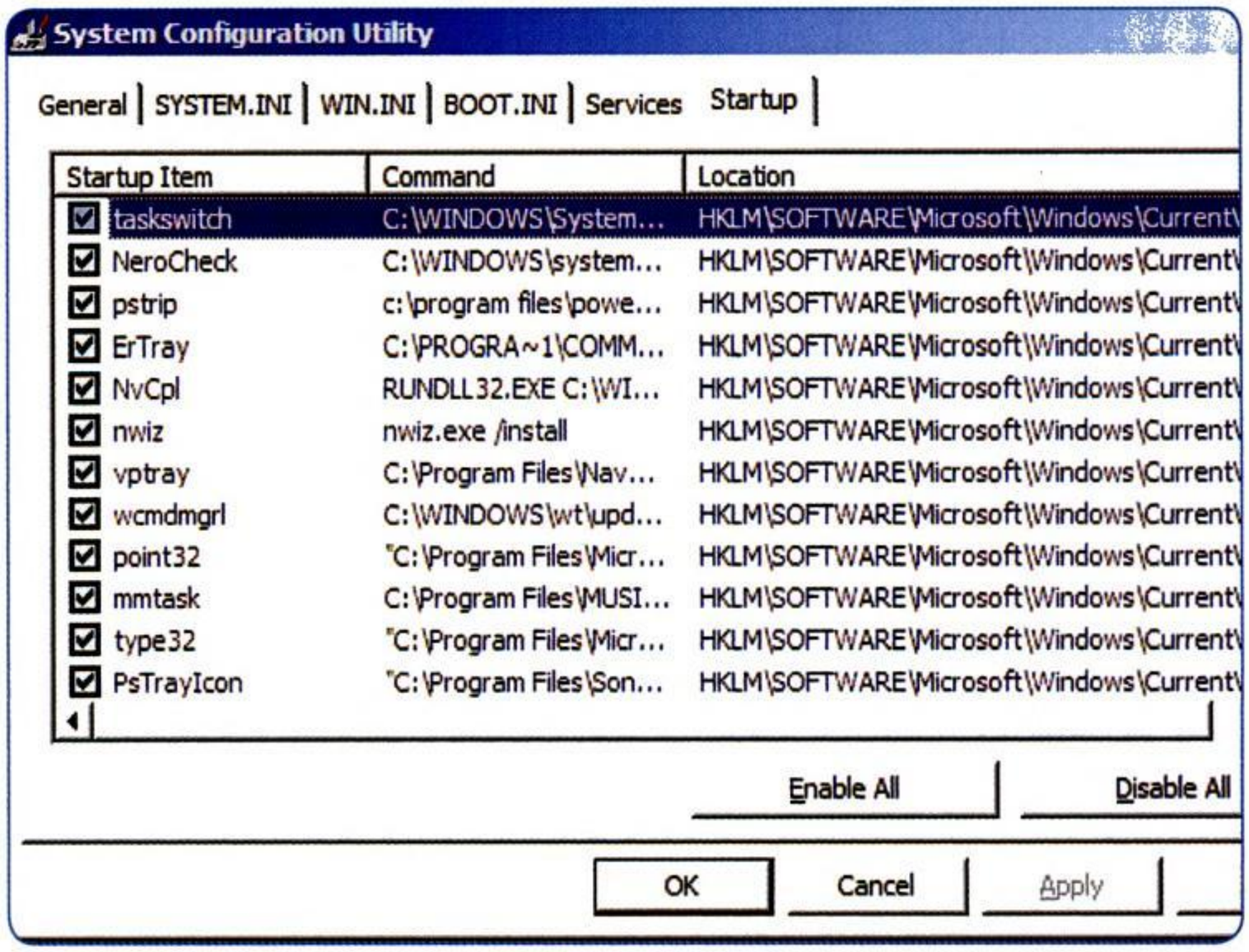
TORPEDO SYSTEM TRAY APPS—KEEP EVIL APPS FROM EATING YOUR RESOURCES

Every frickin' application we install lately seems to dump some sort of craptacular applet into our System Tray. We're so sick of it, that we now summarily give these tiny apps the death penalty. Don't worry, it's easy and fun for the whole family!

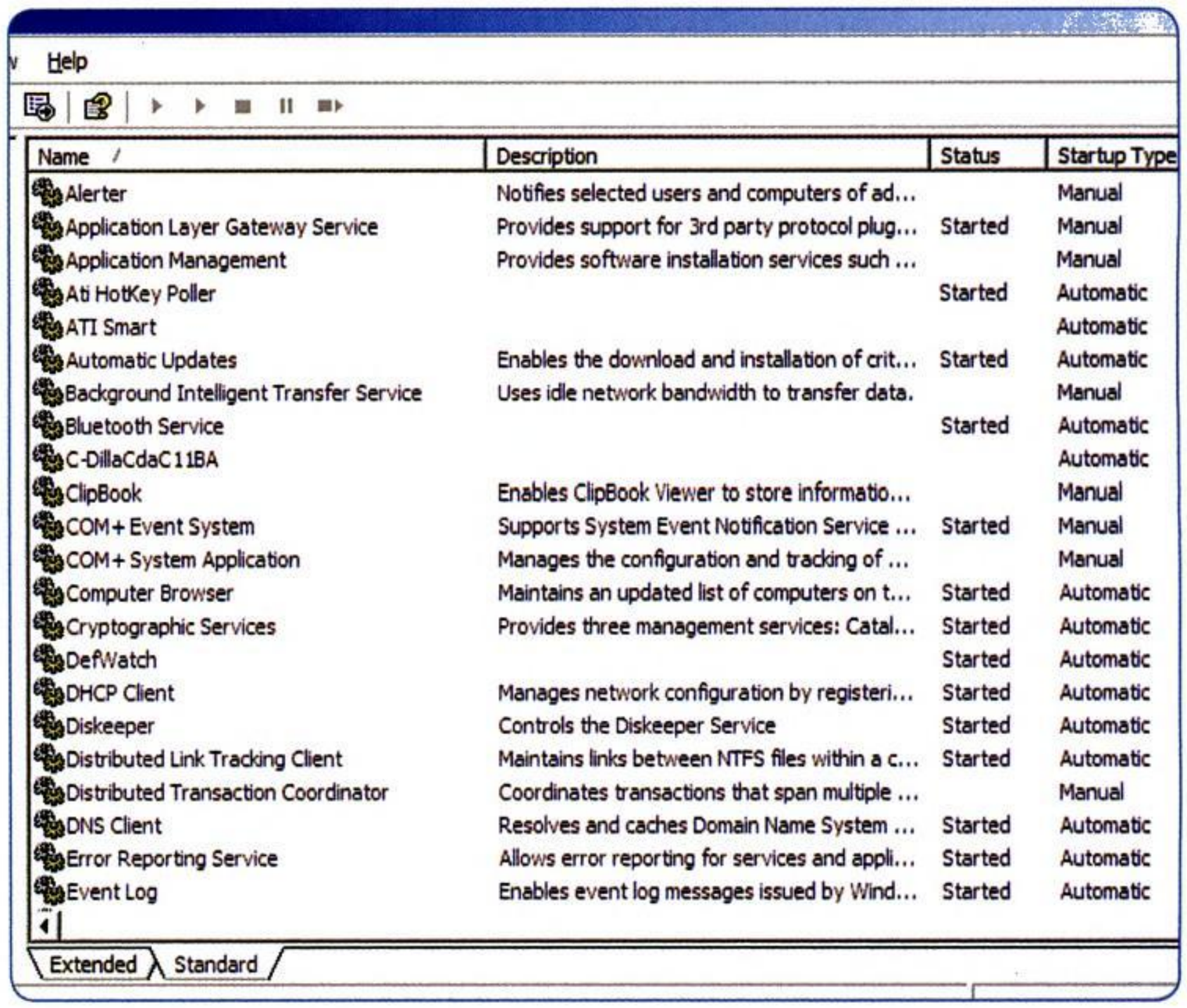
To kill the apps, you need to root them out at their source. You could visit the Registry, the Startup folder, and the other secret places where software apps hide their auto-starting hellspawn, but it's easier to use the msconfig tool. To start it, go to Start, Run, and then type `msconfig.exe`. When the app opens, go to the Startup tab. The vast majority of your evil Systray apps can be disabled from here.

The difficulty lies in figuring out which apps you need, and which you don't. Stretch the command heading far enough to the right so you can see the entire path to the app. Most of the time you'll be able to tell the name or manufacturer of the app by looking at the place where it's saved on your hard drive. If the path to the application doesn't give you a hint, open My Computer and browse down to the program. Right-click it, and select Properties. Click the version tab, and browse through the options there. Look for a company name or product name to tip you off. We recommend leaving alone any apps that use rundll32 to run; if you mess with those you can disrupt vital Windows processes.

To disable the startup apps, all you need to do is uncheck the box next to each app's name and reboot your PC. It's that simple.



Msconfig lets you selectively disable startup apps. It's tricky to tell what item goes with what app though, because of the cryptic names. It might be obvious that NeroCheck has something to do with *Nero* CD burning software, but what's nwiz? The easiest way to find out is to search for the item's name in Google. Nine times out of 10, someone on the net has already tracked it down.



A service is nothing more than a fancy application that Windows runs at boot, then monitors to make sure it continues running. Disabling unneeded services can help you conserve your precious system resources.

TURN OFF UNNECESSARY SERVICES IN WINDOWS XP PRO

By default, Windows XP Professional loads more than 20 services that do everything from facilitating easy wireless networking to monitoring your PC's health. Many of the services can be safely disabled by home users, which frees up memory and the occasional CPU cycle. To disable a service, go to the Control Panel, then Administrative Tools, then the Services hotkey. Right-click the service you want to disable and select Properties. Then change the Startup Type to Disabled or Manual. Disabling the wrong service could cause odd things to happen, so keep track of what you're modifying, and if you experience any unexplained PC phenomena, re-enable the services you've turned off. Here's our list of tried and true services that are safe to disable:

►**ClipBook:** This service lets you share

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stuff on your clipboard with other people across the network. Kill it.

- **Application Management:** Not on a network? Don't ever plan on remotely installing an app? That's what this service does, so feel free to kill it.
- **Distributed Link Tracking Client:** Another network-based service, this automatically updates your shortcuts to files on remote volumes if they're moved. If you don't use a file server, kill this one.
- **Error Reporting:** Automatic error reporting can get pretty annoying, especially if you're dealing with a misbehaving app. You can kill this service to permanently disable the error report.
- **TPC/IP NetBIOS Helper:** You only need this service running if you use NetBIOS over TCP/IP. If you don't, feel free to kill it.

Ask the Doctor

WILL OVERCLOCKING MY PC MAKE MY WINDOWS APPS RUN FASTER?

Maybe. It depends on the type of overclocking you're talking about. Videocard overclocking gives you absolutely no benefit in 2D Windows apps. In fact, many videocards automatically underclock themselves when they're running in 2D mode.

CPU overclocking, on the other hand, can make a pretty significant impact on some Windows applications. Content creation apps like *Photoshop* can really benefit from a faster CPU, but MS *Office* staples such as *Word* and *Excel* show little to no performance boost when you upgrade from 2GHz to 3GHz or even higher. More common tasks, such as web browsing or checking e-mail, benefit even less than *Office* apps.

The only real reason to overclock is for faster gaming performance. In many games, cranking up the CPU or videocard clocks gives you a commensurate frame rate boost. If you can squeeze out 10 percent more from your videocard core, you could easily net a 10 percent frame rate boost in your favorite game.

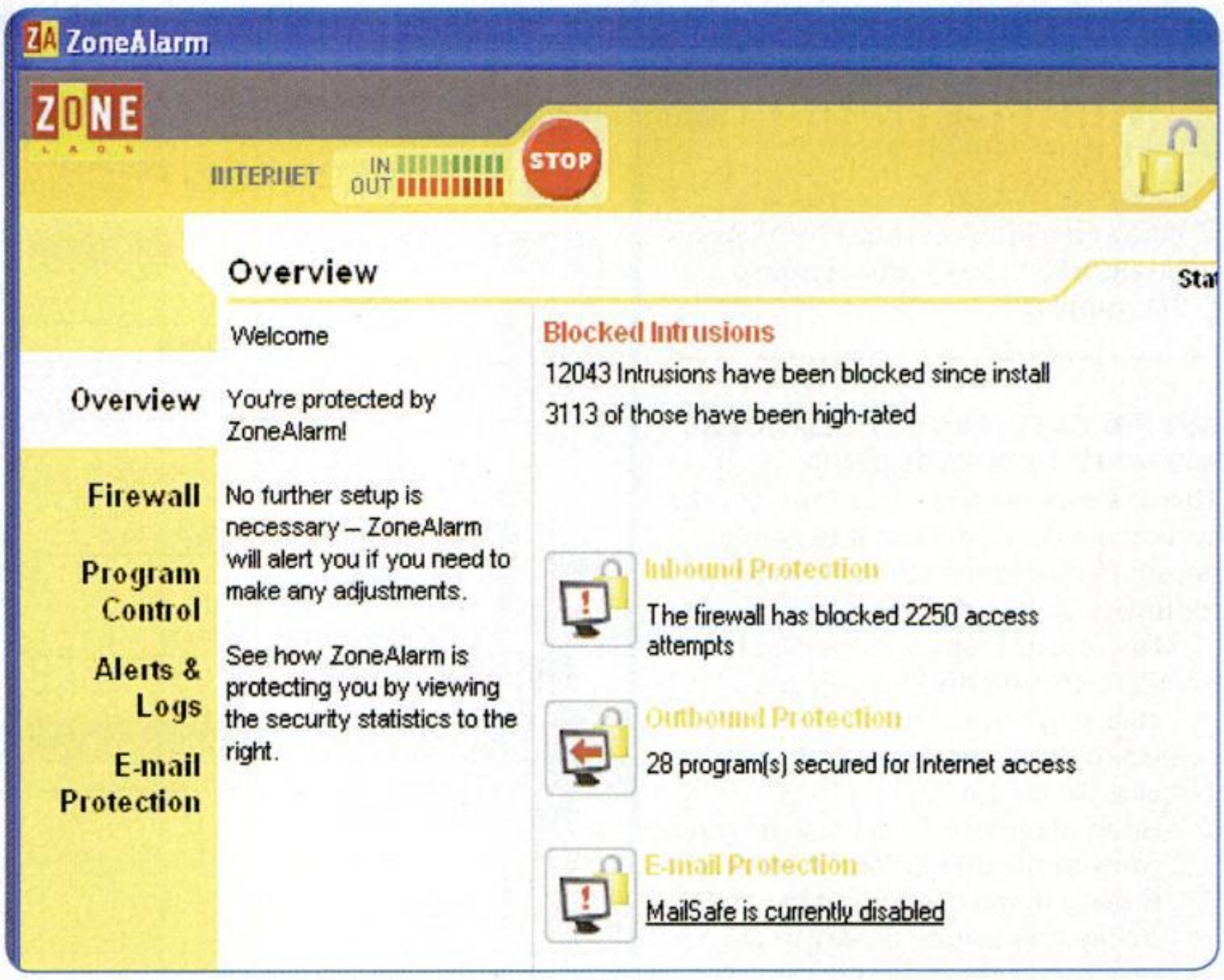
Secure Your PC

Criminal Internet capers are on the rise. Protect yourself from evildoers!

INSTALL A FIREWALL

This isn't so much a tip as a general guideline. Everyone whose PC is directly connected to the net, whether it's via dial-up or broadband connection, should install firewall software. A firewall moderates your connection to the network. Whenever an app tries to send out data or someone on the Internet tries to connect to your computer, the firewall will ask you if that behavior is allowed. You can then allow or disallow the connection.

Firewall software is freely available for personal use, and protects your PC from most worms and viruses that spread without user intervention. We recommend *ZoneAlarm* (**www.zonealarm.com**) for ease of configuration and use, even for relative newbies.



Don't leave your PC open to exploitation! Protect it with *ZoneAlarm*. It will block port scans, ping attempts, and even intrusion attempts by unsavory Dutch persons.

INSTALL ANTIVIRUS SOFTWARE

Antivirus software is absolutely vital today, especially if you download e-mail using *Outlook* or *Outlook Express*. Having proper antivirus software installed will stop those pesky viruses that e-mail everyone in your address book a message containing an infectious attachment. If you don't already have an antivirus program, you should purchase one as soon as possible. We're not kidding. We have recommended *Norton Anti-Virus 2003* in the past, but we haven't had a chance to evaluate the 2004 version yet. If you don't want to wait, download *AVG 7.0 Free Edition* from **www.grisoft.com**. Look for a full review of both antivirus products in next month's *Maximum PC*.

DISABLE UNSECURE SERVICES

We've already touched upon a few of the unnecessary services anyone can disable, but there are also some services that are actual security holes. If you're not sure how to disable services, turn back to the Speed section and check the tip titled "Turn Off Unnecessary Services."

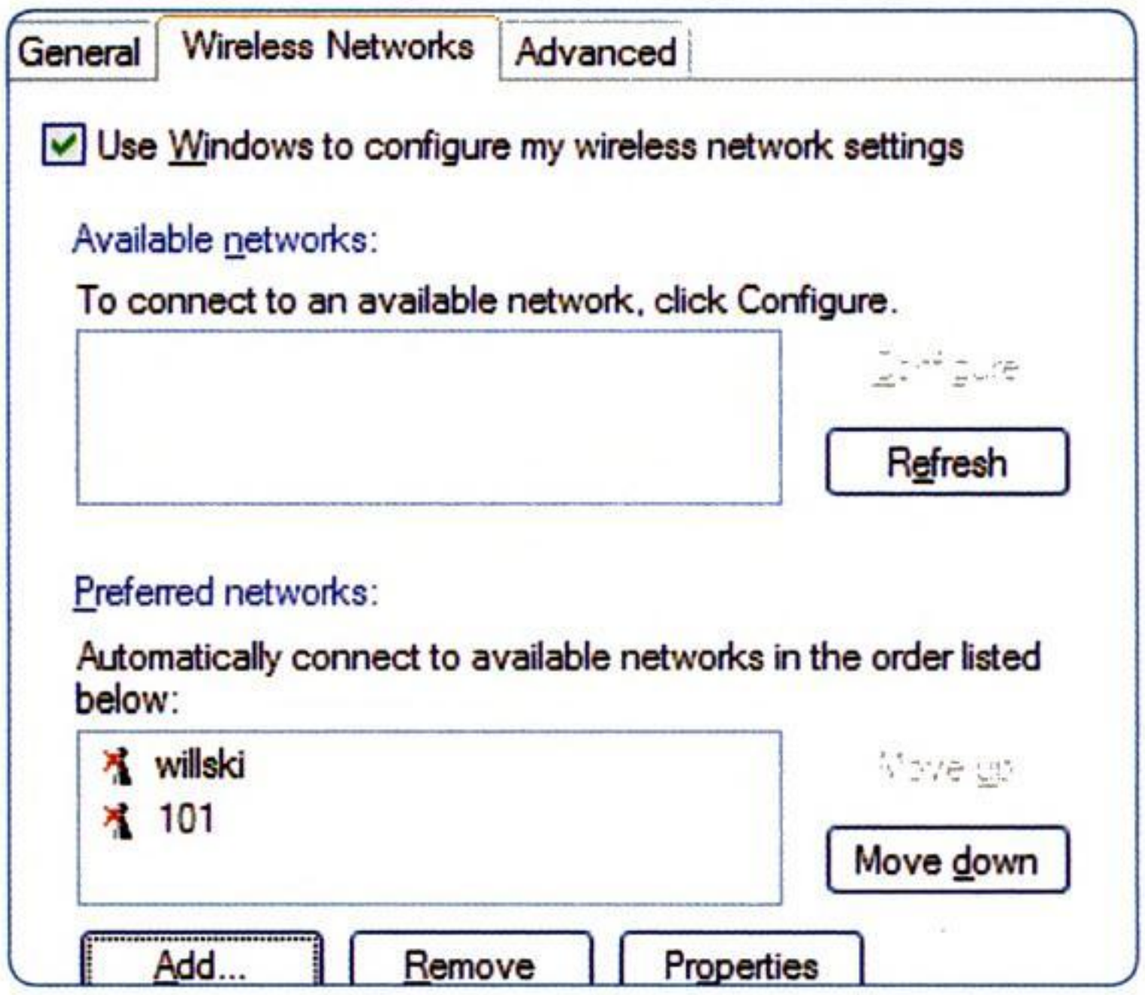
- **Messenger:** In the last year, spammer scum have realized that they can use Windows' built-in messaging service to send spam to millions of XP users. Disabling the service kills all the incoming spam, and no one uses the Messenger service for actual system

administration messages anymore.

- **Remote Registry:** The only purpose of this service is to give other users access to your Registry. If no one but you should have access to your Registry, disable it.
- **Telnet:** If allowing other people to log on to your computer and do whatever they want seems like a good idea, then by all means go ahead and leave the Telnet service enabled. If you'd rather your PC not be taken over by Croatian haX0rs, you should disable it now.

DON'T STOP AT WINDOWS—PROTECT YOUR WIRELESS LAN

Once your Windows install is properly secure, turn your eyes to your wireless LAN. Most of the wizard-type access point installations leave your wireless network wide open for any passing scammer to use. Make absolutely certain that your Wi-Fi LAN uses something other than the manufacturer's default SSID, and always encrypt data moving across your LAN with either WEP encryption or the newer, better WPA encryption. To find out how to change your SSID and enable WEP, you should consult the documentation that came with your access point.



Windows' integrated Wireless Networks configuration interface is easy to use—a little too easy. Many foolish people fail to adequately secure their network, leaving them open to freeloaders and other more malicious folk.

Improve Gaming

Read on to find the perfect balance of frame rate and visual quality in today's demanding 3D games!

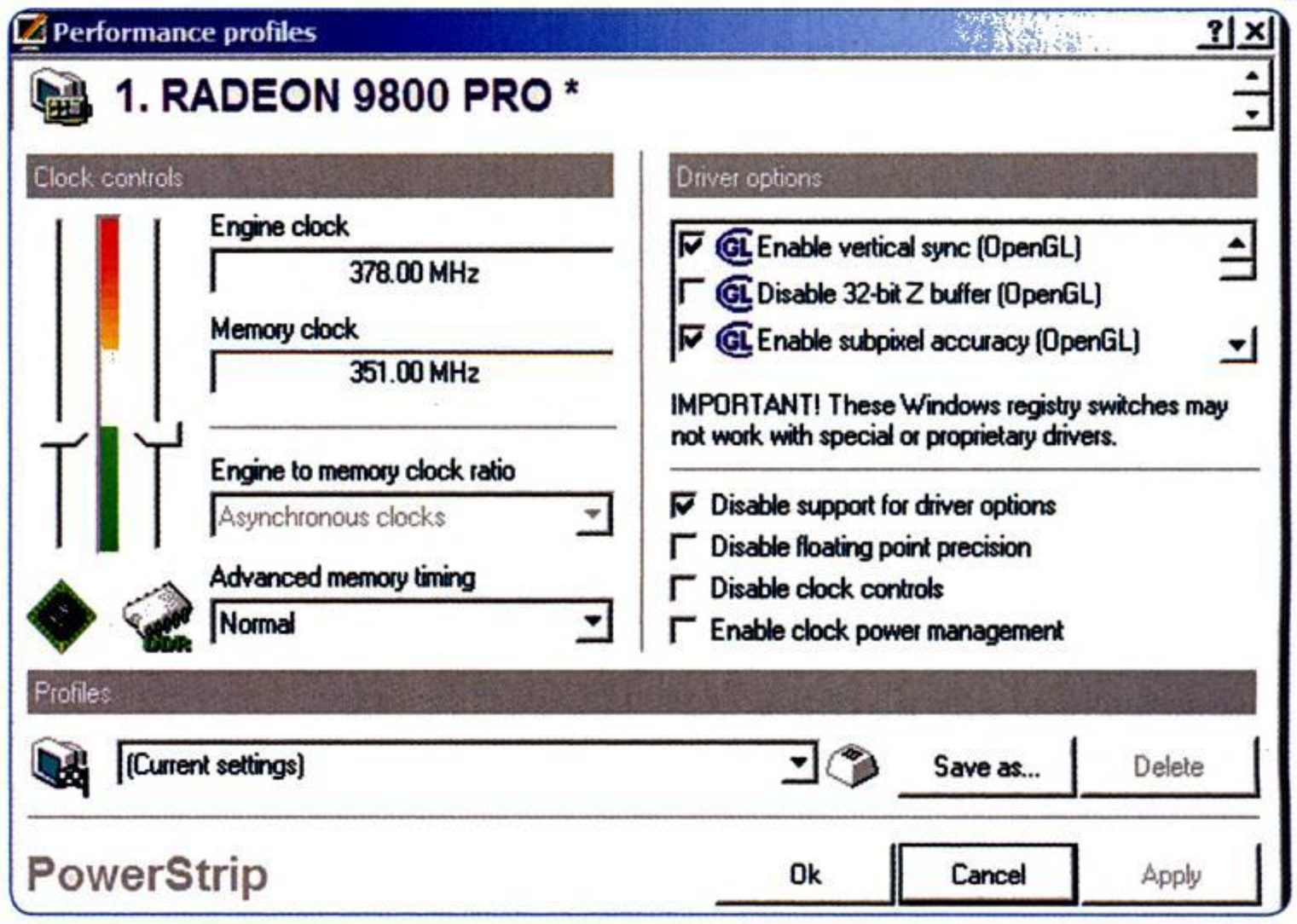
GET AN EASY, FAST SPEED BUMP, WITHOUT OVERCLOCKING!

This is a trick we picked up from sneaky system vendors who use it to gain a decent performance boost in exchange for image quality degradation.

- Open your Display Properties by right-clicking the Desktop and selecting Properties.
- Go to the Settings tab and click Advanced.
- Go to the Image Quality tab on nVidia cards or the 3D tab for ATI cards. Browse to the custom setting and change the texture quality to the minimum setting. Do the same for the mip-map levels slider. Your image quality will decline drastically, but your frame rates will get much better!

USE PROFILES TO MAKE SWITCHING FROM MULTIPLAYER SETTINGS TO SINGLE-PLAYER SETTINGS SIMPLE AND FAST

Both ATI and nVidia have a feature in their latest control panel applications that lets you save all vendor-specific videocard settings in a profile. We recommend you set up one profile with high image-quality settings for single-player games, and a low-quality profile for online games in which you want to max out your frame rates.



***Powerstrip* is the overclocking gateway drug. It makes overclocking your videocard as easy as moving a pair of sliders, and even protects you from doing something stupid.**

OVERCLOCK YOUR VIDEOCARD FOR A FRAME RATE BOOST

Getting a few more frames a second can mean the difference between life and death in a heated online death-match. Most videocards have plenty of headroom, which gives you a perfect opportunity to crank up the clock speeds and get a little more performance from a struggling system. Remember that over-clocking voids your warranty, and just because we've never heard of anyone frying their videocard by overclocking, doesn't mean it's not entirely possible.

Our favorite videocard overclocking app is *Powerstrip*. Download *Powerstrip* at **www.powerstrip.com** and install it on your PC. Once it's running, right-click the

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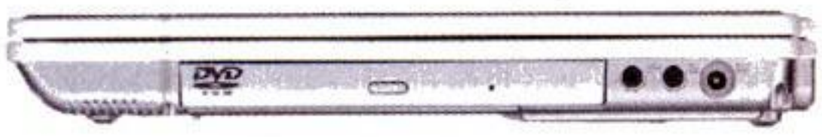

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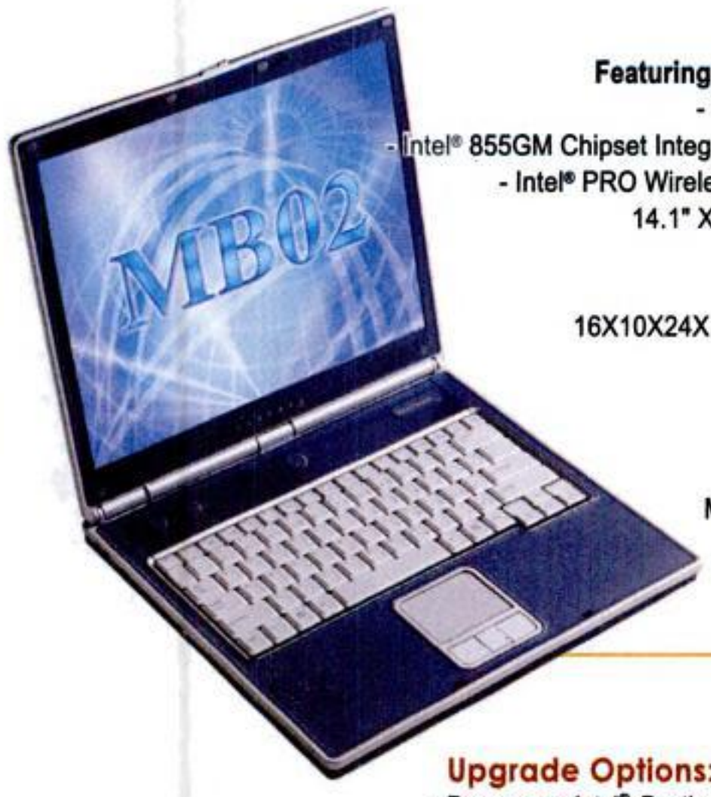

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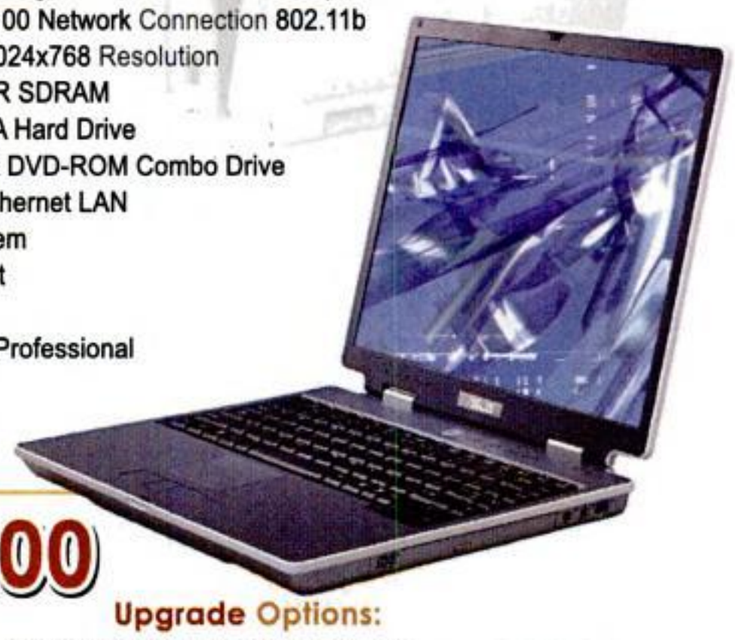

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System Tray icon, select Performance, and click Configure. You should see two vertical sliders, one for the engine (aka core) clock, and one for the memory clock. To overclock your card, all you need to do is move the sliders up.

We recommend you take baby steps when you overclock videocards. Start with 5MHz increments for a single clock. Adjust the core clock first, then test your card by playing an intensive game. When you're playing, watch the screen for any artifacts, static, or deformed polygons. Once you're sure the card is stable at the new clock rate, bump the core clock up another 5MHz. You'll know you've reached your board's limit when you see visual artifacts while testing. When that happens, exit the game and drop the core clock back down 5MHz.

Once you've tested your core clocks, it's time to get started on the memory. Don't expect to push your videocard's memory as far as you can the core clock. Also, you need to remember that the memory clock reported here is the actual clock speed of your card's double data-rate memory, not the effective clock speed that is written on your product's box. Increase the memory clock in small increments using the slider in *Powerstrip,* then test the changes using stressful games.

Ask the Doctor

WHAT DO ANTI-ALIASING AND ANISOTROPIC FILTERING DO? SHOULD I TURN THEM ON?

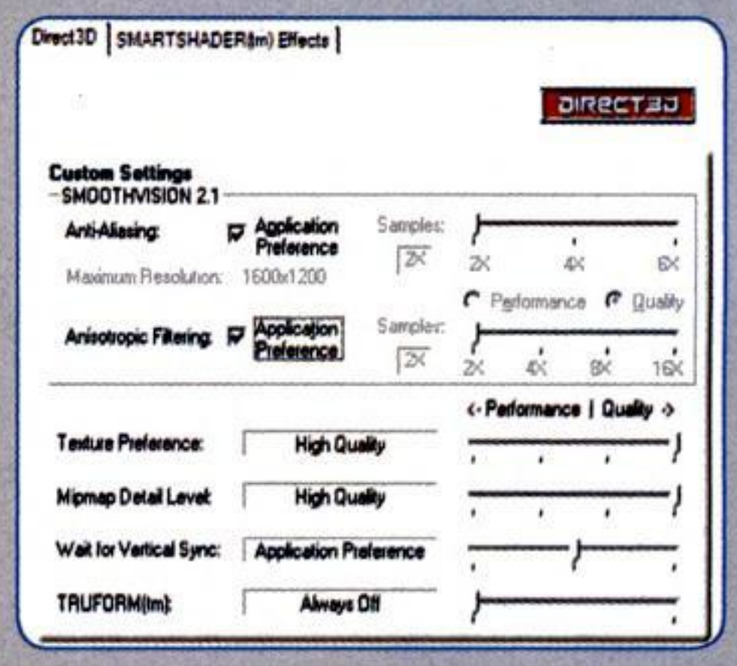
Antialiasing and anisotropic filtering minimize the visual impact of rendering errors in games. Antialiasing smoothes the jagged lines that form on the edges of polygons. Modern videocards antialias polygons by rendering a scene in higher detail than is requested, and then blending it down to a lower detail level. The more samples that are rendered, the smoother the edges look, but increasing the number of samples greatly increases the amount of memory bandwidth required.

Anisotropic filtering helps remove the artifacts created when you stretch a flat, square two-dimensional texture over a three-dimensional model. Anisotropic filtering samples several different texture qualities to ensure that textures that stretch from the foreground into the background draw properly. Without anisotropic filtering, affected textures will lose definition and appear muddy. Like antialiasing, anisotropic filtering is memory bandwidth dependant.

Whether you should turn on antialiasing and anisotropic filtering depends on the type of videocard you have, your PC's speed, and the type of game you're playing. For single-player games like *Knights of the Old Republic* or *Deus Ex: Invisible War* we generally crank up the image quality all the way. As long as the frame rate stays above 30fps we're happy. This means that a person with a fast CPU and videocard can run single-player games with antialiasing at 4x and anistropic filtering at 8x and experience a great looking game. If your PC won't run your games at this high a setting, try 2x AA and 4x aniso.

On the other hand, in multiplayer games, frame rate equals life. If you're in a deathmatch and your opponent's PC renders the game at 60fps but your PC is chugging along at just 30fps, he gets twice as many chances as you to aim and shoot. Frame rate is especially important in games like *Planetside*, where 300-person battles aren't uncommon. For multiplayer games, we generally turn down the detail (and the fancy features like antialiasing and anisotropic filtering) all the way, but run at the highest resolution we can while maintaining 60fps.

Most of the games we test today are limited by the available memory bandwidth of the videocard more than anything else. As we see more games that utilize programmable shader technology, we expect that memory bandwidth will become less an issue, and that shader capabilities will become the limiting factor. From early benchmarks, it looks like *Half-Life 2* will be limited by shader performance more than memory bandwidth. If this ends up being the case, you should be able to enable bandwidth intensive features like AA and aniso without any impact on your frame rate at all.



You can override your games' antialiasing and anisotropic filtering settings, but it's not always a good idea.

Many newer games let end users set antialiasing and anisotropic filtering in-game instead of forcing on settings in the driver's control panel.

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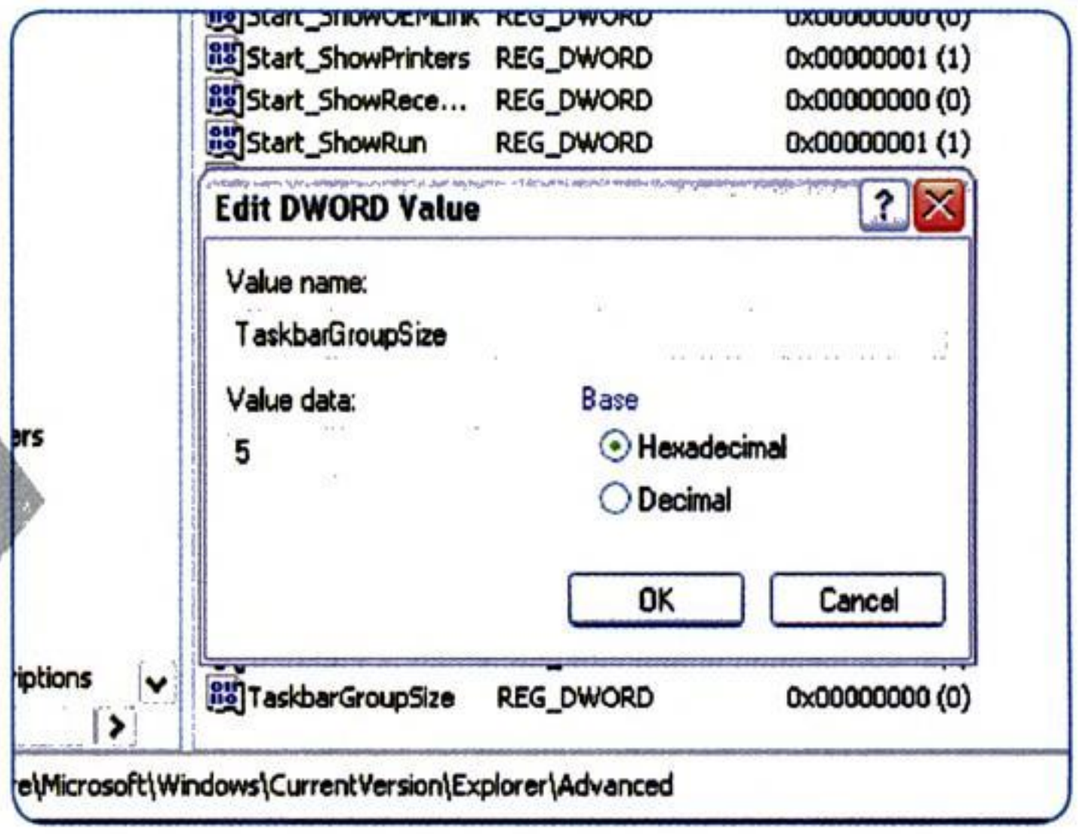
Customize Your Interface

Turn Windows XP into a more efficient, effective, and attractive OS with these simple, painless steps

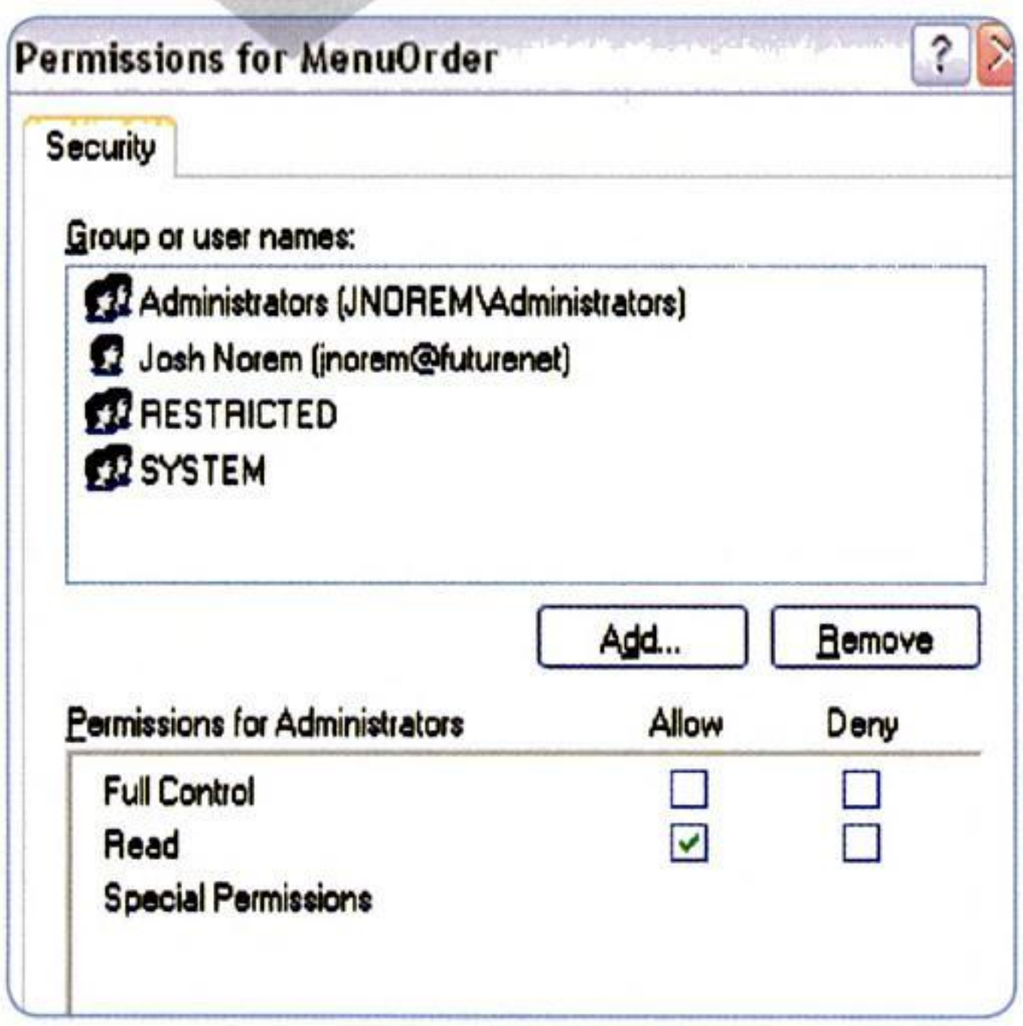


If you want to avoid Taskbar clutter, pick a low number for this setting to keep multiple windows of the same app grouped together.

FORCE ALPHABETIC SORTING OF THE PROGRAM MENU

Clicking "Sort by Name" in the All Programs menu makes finding your applications a lot easier, but Windows XP needs constant reminders to sort applications this way. This tweak will permanently sort all your programs alphabetically.

- ►Open the Registry and go to HKEY_Current User\Software\Microsoft\Windows\CurrentVersion\Explorer\Menu Order.
- ►On the Edit menu, select Permissions.
- ►In the "Permissions for MenuOrder" dialog box, click Advanced.
- ►In the "Advanced Security Settings for MenuOrder" dialog box, clear the "Inherit From Parent" check box.
- ►In the security dialog box that appears, click Copy.
- ►Click OK to return to the "Permissions for MenuOrder" dialog box, and then clear the "Full Control Access" entry for your own account and for any security groups that you're a member of, leaving the "Read Access Control" entry in place.



Tired of constantly telling Windows to sort your programs by name? It's time to make the changes stick.

GROUP YOUR TASKBAR MORE EFFECTIVELY

Windows XP automatically groups applications together when the taskbar fills up, but you can make it group items whenever you'd like.

- ►Open the Start Menu, select Run and type `Regedit`.
- ►Go to HKEY_Current_User\Software\Microsoft\Windows\CurrentVersion\Explorer\Advanced.
- ►Click Edit, select New, and then DWORD value.
- ►Name this new value: `TaskbarGroupSize`
- ►Once named, right-click it and select Modify.
- ►Type in the number of windows that appear before Windows starts grouping them. We like the number five, but use a smaller number if you want an uncluttered taskbar, or a higher number if you like to see each open window.

MAKE YOUR START MENU EASIER TO NAVIGATE

Is Start menu clutter chapping your hide? Put a little breathing room between all those apps with this handy hack.

- ►Right-click your desktop and make a new shortcut.
- ►Select any target for this shortcut (it really doesn't matter which).
- ►To give the shortcut a name, erase any text in the Name field and hold down the ALT key while punching `0160` on the number pad, which will give the shortcut an empty field for a name. Click OK.
- ►Right-click the new shortcut and remove the target. Next, click Change Icon and select a blank icon. Now simply drag it onto the start button, and then drag it to the desired location.

GET RID OF YOUR EBOOKS ONCE AND FOR ALL

It happens to us all: You deleted your My eBooks, My Videos, and My Music only to open up the same folder a few minutes later and find they had in fact not been deleted after all. It's time to get rid of them for good!

- ►Go to Start, then Run.
- ►Type `Regsvr32 /u mydocs.dll` and hit Enter.
- ►Go into My Documents and delete any of those "My" folders you want—they're not coming back!

ADD YOUR OWN USER ACCOUNT PICTURES

XP's default account icons are kind of lame. Here's how to add your own images.

- ►Resize your .bmp images to 48x48 pixels
- ►Copy your images to C:\Documents and Settings\All Users\Application Data\Microsoft\User\Account Pictures\Default Pictures. (Application Data is a hidden folder). You can also delete any pictures you don't want.
- ►Click the Start button, then click over the account image. This will take you to a new window that tells you to choose another pic for your account.

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Find your picture, select it, click Change Picture, and you're done.

HIDE THE RECYCLE BIN FROM YOUR DESKTOP

Can the trash can via the Registry. Open Regedit and explore HKEY_Current_User\Software\Microsoft\Windows\CurrentVersion\Explorer\HideDesktopIcons\NewStartPanel. Make a new DWORD value with the name {645FF040-5081-101B-9F08-00AA002F954E}. Set the Modify value to "1."

To restore the Recycle Bin, Modify the same DWORD value to "0."

An even easier way to remove the Recycle Bin is to download *TweakUI*, one of Microsoft's *Windows XP Powertoys*. Once installed, go to the Desktop section, and uncheck Recycle Bin.

CHANGE THE LOGON BACKGROUND COLOR

Open Regedit and navigate to the following Registry key: HKEY_Users\Default\Control Panel\Colors. On the right-side details panel, double-click Background String Value. Change this number to a three-digit RGB value, then click OK.

HIDE SYSTEM TRAY ICONS

Want to make it look like you have no apps running in the background? Or maybe you just need to hide one or two more, um, private apps down in the Systray? Enter Regedit and navigate to HKEY_Current_User/Software/Microsoft/Windows/CurrentVersion/Policies/Explorer. Add a REG_DWORD entry titled "NoTrayItemsDisplay". Open it and assign a hex value of "1" to hide the icons. Close Regedit, reboot the system, and the icons should be gone. If you need to call them up, just bring up the Windows Task Manager.

REMOVE IMAGE PREVIEW

Open Regedit and delete the followingkey:HKEY_Classes_Root\SystemFileAssociations\Image\ShellEx\ContextMenuHandlers\ShellImagePreview.

LEARN WINDOWS KEYBOARD SHORTCUTS

Here's a brief list of some of our favorite time-saving keystrokes:

Alt + Shift + Tab: Goes through your apps in reverse order.

ALT + d: Moves the cursor in *IE* to the address bar.

Shift + insert a CD: temporarily disables Autoplay.

Windows key + Pause/Break: Opens System Properties.

Windows key + f: Opens the Search Window.

Windows key + e: Opens Windows Explorer.

Windows key + d: Minimizes all windows

We love pinning apps to the Start menu, but when the list gets too long, it's time to add one of these separators to make navigation easier.

ASSIGN KEYBOARD SHORTCUTS TO YOUR FAVORITE APPLICATIONS

Quickly and easily access your favorite applications and files by right-clicking an icon on the desktop or in an open window. Click Properties, then go down to the Shortcut Key field and enter the desired keystrokes.

Ask the Doctor

I HAVE DUAL DISPLAYS. HOW CAN I SET UP WINDOWS TO USE A DIFFERENT DESKTOP IMAGE ON EACH MONITOR?

Try this little hack, which allows you to use different desktop wallpaper for each of your displays. As always, be sure to use a high-res image to reduce dithering.

- **Right click your desktop, then select Properties.**
- **Under the Desktop section, select Customize Desktop, then select the Web tab.**
- **To use an image file located on your hard drive select New and browse to the file's location. Once you've selected the file you want, click OK and it will appear on your desktop.**
- **Now, simply drag the image over to the second desktop and from the image's pull-down menu in the upper left-hand corner select Cover Desktop.**
- **Right-click and select Arrange By and "Lock web items on desktop." Now you can select a standard desktop for your primary display and use the web object to cover the standard desktop image on your second desktop with the image of your choice.**

Woohoo! I got a big one! Although a JPEG isn't a "web object," it still works as desktop wallpaper.

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Optimize Your Day-to-Day Usage of Windows XP

Improve OS clutter, enhance your overall Windows experience, and automate certain tasks with this collection of handy, obscure, and extremely powerful tricks, hacks, tweaks, and downloads

MONITOR YOUR CPU USAGE AT ALL TIMES

Ever wonder what your CPU is up to? Keep an eye on it by sticking the CPU monitor from the Task Manager in your System Tray.

- Go to C:\Windows\System 32 and find Taskmgr.exe. Right-click it and select "Send to Desktop." Go to that new shortcut and right-click it, then select Properties.
- Under the Run command select "Minimized" and click OK.
- Rename the shortcut "CPU Meter" or something similar, and cut it from your desktop using CTRL + X.
- Right-click the Start menu, select "Explore All Users," then click on the Programs folder, and the Startup folder. Paste the CPU Meter into the Startup folder.
- You should see it pop up in your System Tray. If not, open the Task Manager and under Options make sure "Minimize on Use" and "Hide when Minimized" are selected.

"I'm giving her all she's got, captain!" Keep tabs on your CPU by sticking this handy little CPU monitor in your System Tray.

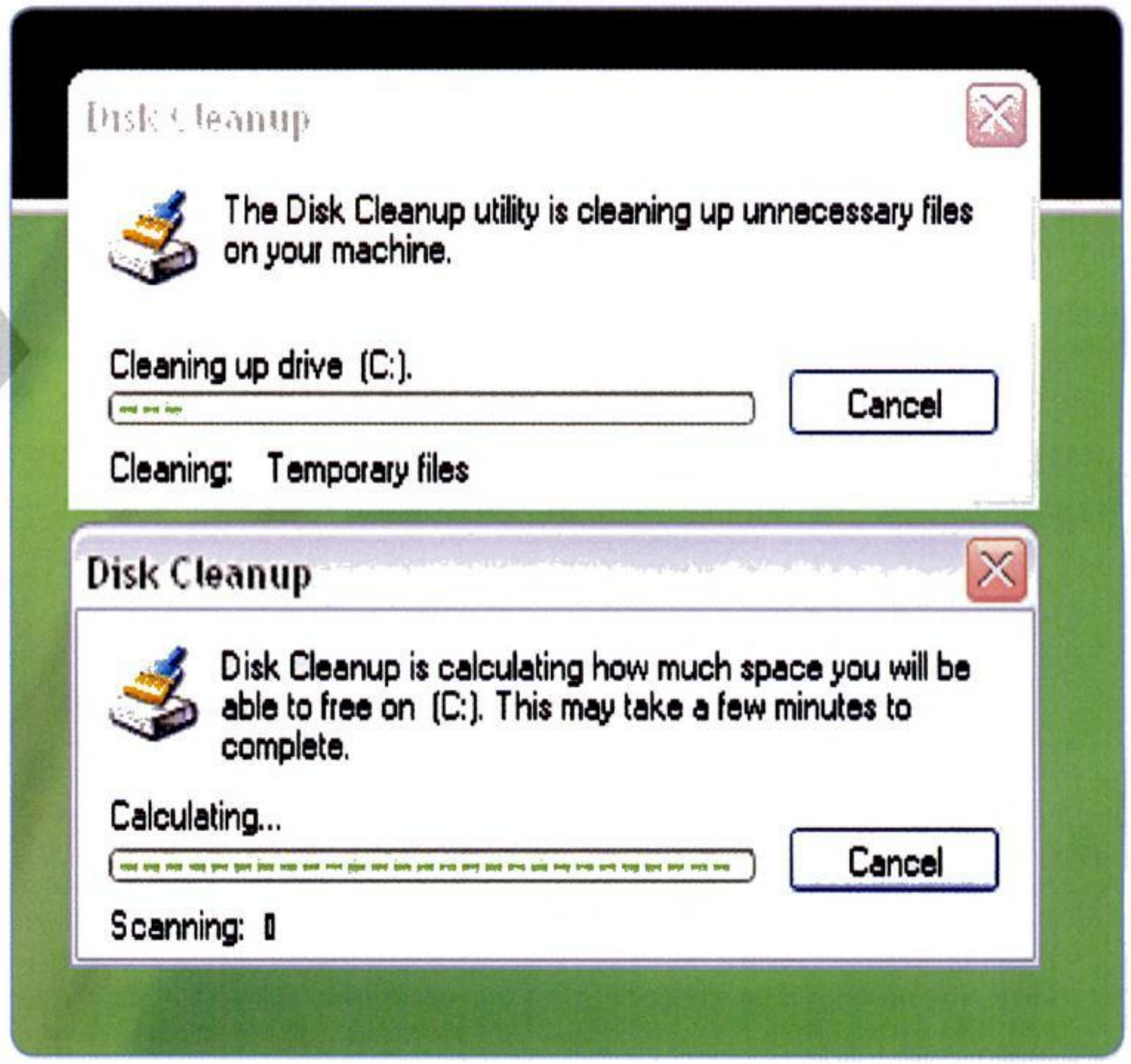
AUTOMATE HARD DRIVE CLEANING

Want your hard drive to be fresh and ready to roll whenever you sit down to compute? So do we. This little tweak automates the hard drive "cleaning" process and keeps your drive bright-eyed and bushy-sectored.

- Right-click your desktop and create a new text file. In this file type:

```
C:\windows\system32\
cleanmgr.exe /dc /sageset: 1
C:
cd\
cd c:\windows\prefetch
del *.* /q
```

- Save the file, but change the extension to .bat. Name it whatever you like.
- Now run the file you just renamed. This opens the *Disk Cleaner* program. Select the items you'd like it to clean for you when it runs unattended, and click OK.
- Right-click the file you created and select Edit. Change the first line to read: `C:\windows\system32\cleanmgr.exe /dc /sagerun: 1`
- Save the file. Now you can execute it to automatically clean up your disks or set it to run automatically via Control Panel>Scheduled Tasks>Add New Task.



Set Windows to automatically clean your hard drive by creating a simple .bat file that you can schedule via Control Panel>Schedule Tasks>Add New Tasks.

SHUT DOWN YOUR PC FASTER

If you're sick of performing multiple clicks to shut down your PC, listen up.

- Right-click your desktop and create a new shortcut.
- In the location line, type:

```
shutdown -s -t 0
```

- Name it and click OK. You might want to give it a different icon, such as the red shut-down icon.
- Drag this icon onto your quick launch taskbar or leave it on the desktop. Either way, clicking it once will now completely shut down your PC.

To make a similar restart shortcut, the location line needs to read: `shutdown -r -t 0`. (That's a zero at the end, not an "oh.")

ENDLESS SUPPLY OF NEW FOLDERS

This is an easy way to create new folders. Rather than using the File menu or right-clicking and selecting New and then Folder, you can just use the Quick Launch toolbar instead.

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Boom. One click and your PC turns itself off. Handy, huh?

Drag this little folder out of your Quick Launch toolbar to create a New Folder anywhere, anytime you choose.

►Surf over to C:\Documents and Settings\Username\Application Data\Microsoft\Internet Explorer\Quick Launch.

►Open the Quick Launch folder and create a new folder within this folder. Leave its name as New Folder.

You'll see that a New Folder has appeared in your Quick Launch toolbar. To create a new folder anywhere on your PC, simply hold down the CTRL key and drag the new folder to its location.

CHOOSE YOUR SEARCH COMPANION

We really hate the XP search companion, so here's a way to toggle back and forth between the OG style and the new doggy style.

►Go into the Registry and click to HKEY_Current_User\Software\Microsoft\Windows\CurrentVersion\Explore\CabinetState.

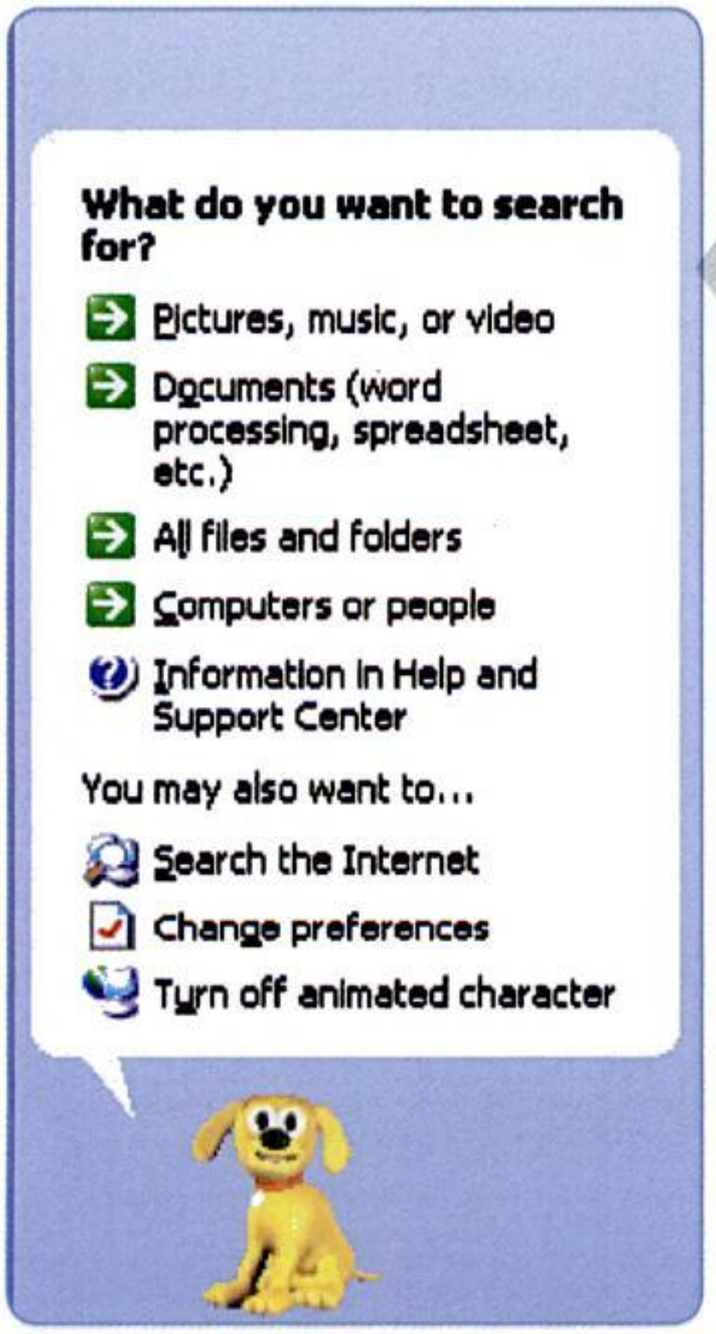
►Open the CabinetState key, right-click inside the right-side pane and select New and then String Value.

►Name this new value `Use Search Asst`, and then press Enter.

►Right-click this new value and type "No" in the value data field, then close the dialog box. Now, right-click the CabinetState key and select Export. Name the file you are exporting "Disable Search Companion," and make sure the Selected Branch Option button is selected. Close the Registry editor.

►Open the Disable Search Companion Registry entry in *Notepad* and find the line "Use Search Asst = no". Change that value to "yes", all in lowercase. Save this entry as "Enable Search Asst."

Now, whenever you click on each of these respective Registry keys they take effect immediately—no reboot required.



Don't tell PETA, but we banished the puppy from our search window forever! Luckily, we can coax him into returning with just a few clicks of the mouse.

CUSTOMIZE WINDOWS' PRESET FOLDER DISPLAY

Whenever you open a file on your PC, Microsoft lovingly presents you with preset folder options on the left-side of the dialog box. Thanks, Redmond, but we don't open items from our History or Favorites very often. Here's how to put what you want in that list.

►Go into the Registry and cruise to HKEY_Current_User\Software\Microsoft\Windows\CurrentVersion\Policies\comdlg32.

►Create a new key called Placesbar.

Inside this key create a string named `Place0` and point it to the folder you want to appear on the Open dialog box, such as C:\CurrentWork for example.

►Create another string called `Places1` and point it to another location on your drive.

An easier way to tackle this tweak is to download *TweakUI* (see accompanying sidebar), which will allow you to similarly customize your menus. Just open Common Dialogs, Places Bar, then select or type the locations of your preferred folders.

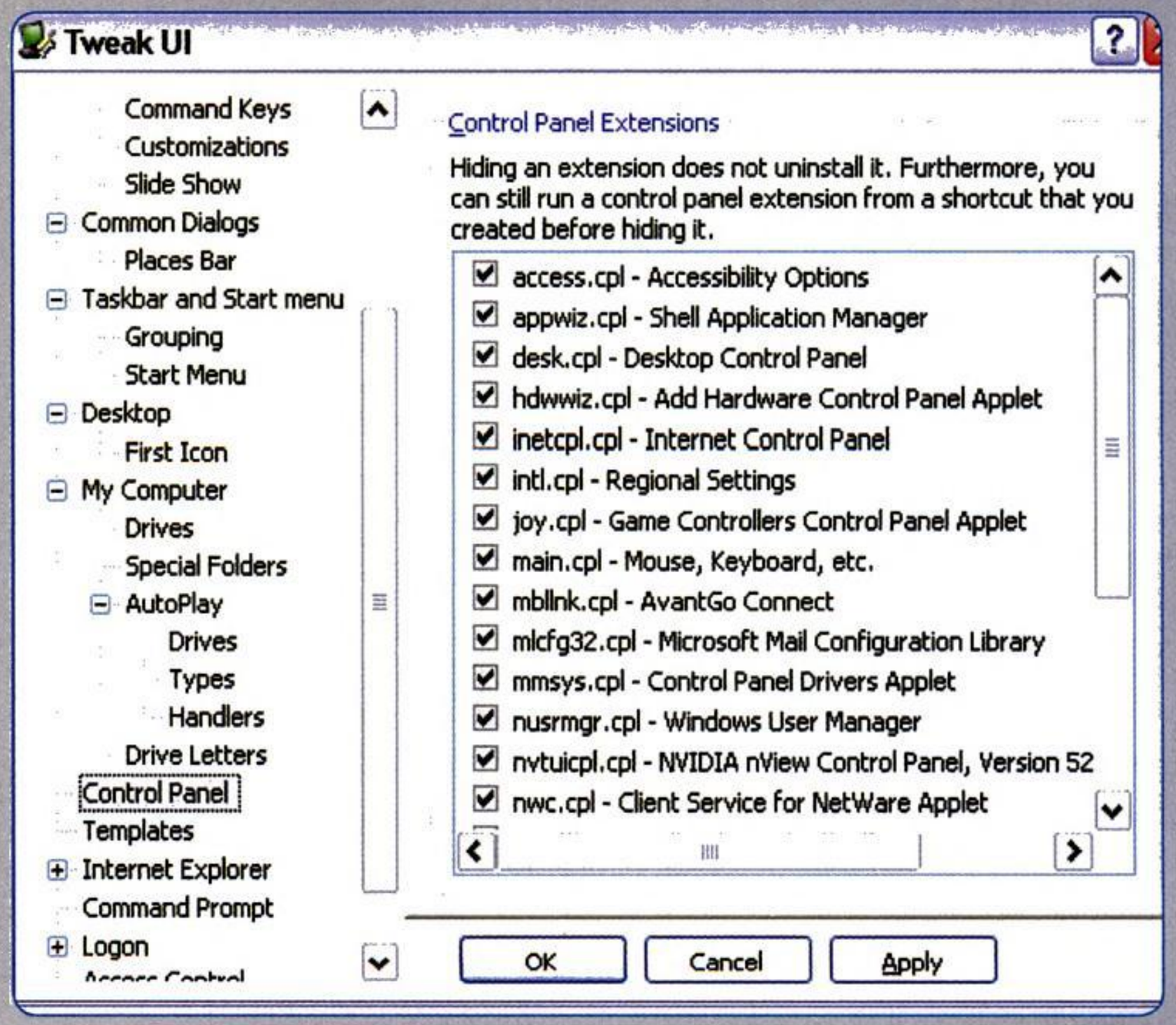
Customizing your "My Places" will allow you to save time opening and saving your files.

Three Utilities That Make XP Tweaking Easy

Foraging around in the Windows Registry is sort of like defusing a bomb—one wrong move and it's lights out for your OS and your PC. It's also time-consuming to edit keys individually, which is why several utilities exist that allow easy and relatively safe access to myriad Registry hacks.

TweakUI

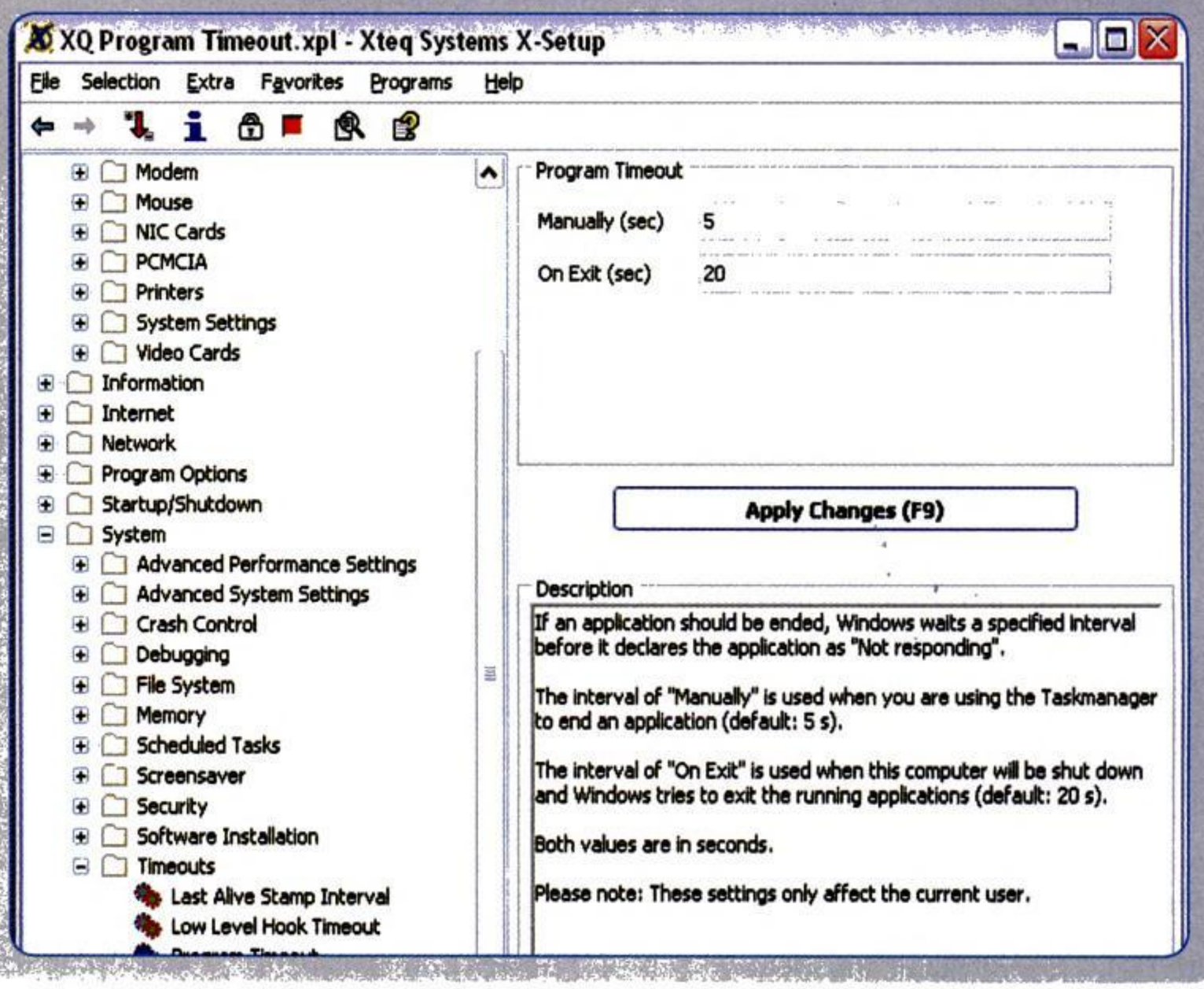
The most popular of these utilities is easily Microsoft's very own *TweakUI*. It's a part of Microsoft's *XP PowerToys*, a set of free enhancements for XP that are designed—but not officially supported—by Microsoft. This app is divided into nine major groupings, and offers tweaks for everything from *Internet Explorer* to Windows menus, dialog boxes, mouse movements, and so forth. Although Microsoft doesn't allow this utility to be distributed via our cover-mount disk, we've placed a link to *PowerToys* in the disc's Extra section. Or just go to www.microsoft.com/powertoys.



X-Setup

Another useful tweaking app is *X-Setup* (www.xteq.com) from Xteq Systems. This powerful utility goes above and beyond the settings available in *TweakUI* by delivering a dizzying array of tweaks most people don't even know are possible. It includes mundane tweaks such as disabling your keyboard's Windows keys to advanced tactics like clearing out the XP Prefetch folder to setting timeout lengths for locked programs.

Xteq calls its program the "ultimate tool for black belt system tuning," and it's not whistling Dixie. X-Setup is on this month's Maximum CD in the Utilities section, so be sure to give it a whirl.



TweakXP.com

TweakXP (www.tweakxp.com) is the largest and most useful repository of Windows XP tweaks we've found anywhere. The site is literally a clearinghouse for every possible Windows XP tweak available and is organized by tip type, function, and difficulty. Bookmark it now!

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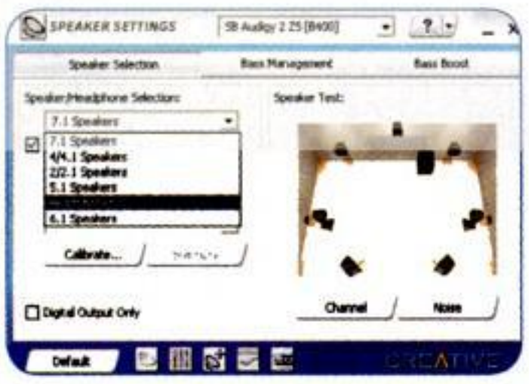
Optimize Windows Audio

Tune and perfect Windows XP's audio settings

SET YOUR SOUNDCARD FOR THE TYPE OF OUTPUT YOU'RE USING

If you're like us, you use speakers in the day and switch to headphones when your wife, husband, or roommates go to bed. However, switching to headphones from speakers isn't just a simple matter of jacking in. Modern advanced audio hardware uses complex algorithms to render audio. These algorithms are so precise that playing with head-phones when the soundcard is still set to render for desktop speakers will make everything sound a little off and/or distorted.



Not setting the applet for the correct output device will cause audio artifacts or incorrect audio rendering.

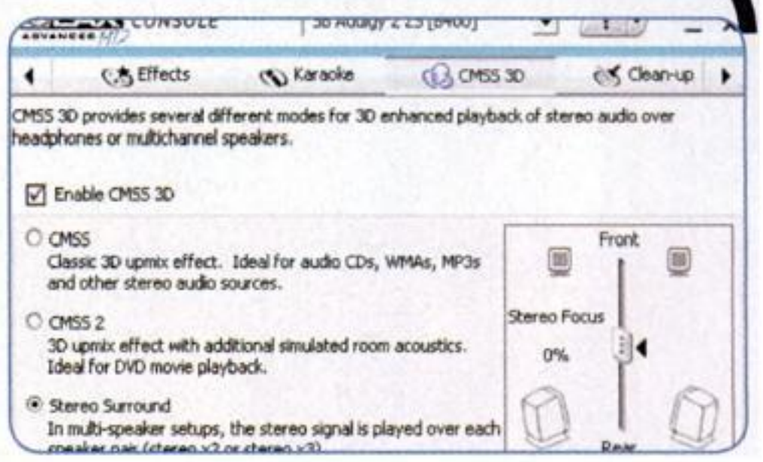
To optimize your audio for your output device, steer to your soundcard's speaker configuration applet and look for a setting that lets you change it to 7.1, 6.1, 5.1, 2.1, or headphones. In some cases you may have to reboot. If your card doesn't have an applet control for speaker configuration, use the one built into Windows XP. Go to Control Panel>Sounds and Audio Devices, and under Speaker Settings select Advanced. Then pick your poison. In cards like the Sound Blaster Audigy 2 ZS or onboard audio devices like Analog Devices' SoundMax, setting the application applet will override the Windows XP setting. Keep in mind that some soundcard drivers may need you to set both the Windows XP control panel and the soundcard applet for the setting to work properly.

ENABLE STEREO EXPANSION MODES

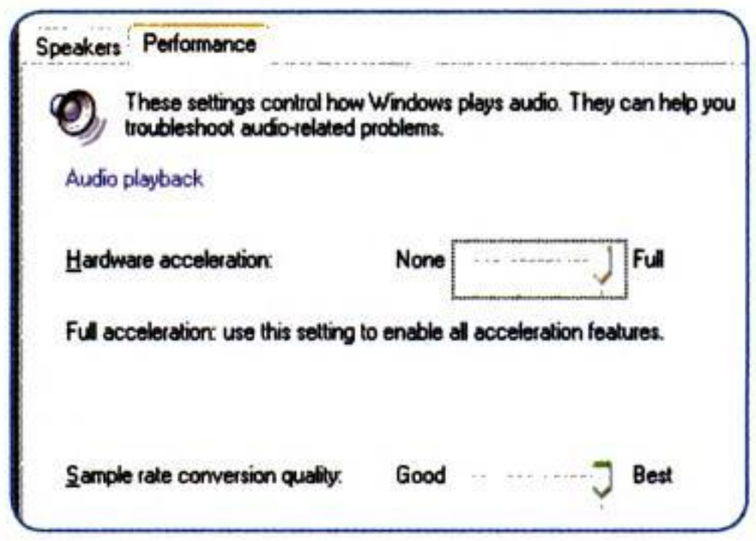
If you have a set of 7.1 or 5.1 surround speakers hooked up to your PC and you play mostly MP3 or CD audio, you may have noticed that audio only comes out through the front pair of stereo speakers. That's because, unlike video games or DVD movies, the source audio on most MP3s and CD audio is stereo only. Fortunately, most advanced audio hardware today features expansion modes that can filter the audio. In these filtered modes, music and vocals can be shunted to the front speakers while instruments get sent to the rear. Other modes duplicate the front stereo to the rear for a fuller sound. To enable this, poke around in your audio applet and look for an expansion check box. In the popular Creative Labs series of Live!, Audigy, and Audigy 2 cards it's called CMSS or CMSS2. Enabling audio expansion or just turning on Stereo Surround should give those other slacker satellites some work.

DIRECTSOUND GOOD, WAVE-OUT BAD

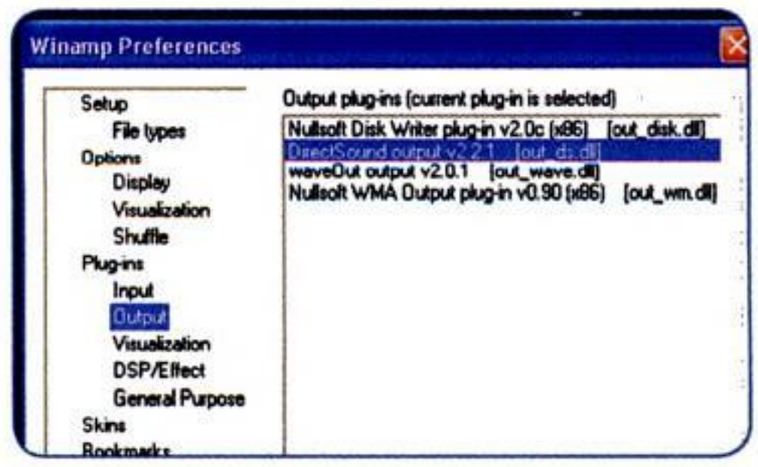
Applications such as the popular *WinAmp* and many soft DVD players default to the wave-out for audio. Unfortunately, using wave-out does all the mixing in software, thus stealing precious CPU cycles. That may not matter if you're pushing a 3.2GHz P4 or Athlon 64 FX hog, but if you paid extra for an Audigy 2 ZS or nForce2 motherboard with advanced audio, what's the point of rendering it on the CPU? To set your PC to use DirectSound over wave-out, go into the configuration or setup section of your application (in *WinAmp*, hit Ctrl-P and select Plug-ins, Output). Set it to DirectSound for hardware acceleration goodness. In *InterVideo WinDVD 5*, it's under Audio/Advance Audio. Then simply set it to DirectSound.



Setting the Creative Labs' control panel to Stereo Surround or CMSS lets the soundcard up-mix stereo source material to your surround sound speakers.



If hardware acceleration is turned down even a notch, most sound systems will turn off all acceleration.



Setting your audio applications to use DirectSound over wave-out will let the hardware acceleration of your soundcard or motherboard do the heavy lifting.

Ask the Doctor

I LOWERED THE HARDWARE ACCELERATION FOR MY SOUNDCARD BY A LITTLE BIT, AND NOW MY PC IS CRAWLING. WHAT GIVES?

Sound vendors tell us that a big complaint from consumers is the performance decrease that results from turning hardware acceleration off. Duh. What we didn't know, however, is that lowering hardware acceleration even a notch usually disables all hardware audio acceleration. To make sure yours is set correctly, go into Control Panel>Sounds and Audio Devices Properties. Under Speaker Settings, click Advanced and then click the Performance tab. Make sure Hardware Acceleration is all the way to the right. Yes, the other right.

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Accelerate Your Apps!

When it comes to our applications, optimization is next to godliness. Here are our favorite tips for speeding up Microsoft *Outlook,* Microsoft *Word,* and *Windows Media Player!*

E-MAIL WITHOUT STARTING OUTLOOK

Sometimes you just want to dash off a quick e-mail without having to launch a big-ass app like Microsoft *Outlook.* Well, now you can.

►Right-click the desktop and select New, and then Shortcut from the pop-up menu.

►A wizard launches; type `mailto:` in the location box (don't forget the colon at the end).

►Name your shortcut something illuminating like "New Email."

From now on, whenever you want to dash off an e-mail when *Outlook* isn't open, just double-click this shortcut, state your business, and click Send. This trick will actually work for other e-mail clients as well, as long as the application is the default MAPI e-mail client.

CUSTOMIZE YOUR MS WORD FILE CABINET

This one is so convenient and fun, we occasionally wonder if it's illegal. You can establish a list of your own frequently used documents directly in Microsoft *Word's* menu bar. Add templated letters with boilerplate text ("Dear John..."). Create a separate menu for all the documents you're plagiarizing for your term paper. Go crazy—here's how.

►Fire up *Word.*

►Go to Tools > Customize.

►In the Categories pane (left side), scroll down to Built-In Menus and click it to highlight the selection.

►In the Commands pane (right side), scroll down to Work. Click it, drag it to the menu bar, and release the mouse button.

►Don't close the Customize window yet! Click your new Work folder to highlight it if it isn't already highlighted, and in the Customize window, click Modify Selection. A drop-down list will appear, allowing you to change the name of the folder. You can also add an ampersand (&) before a character to create a hotkey so you can access the menu with the Alt-key combo (for example, St&uff will let you access the menu by pressing Alt+u).

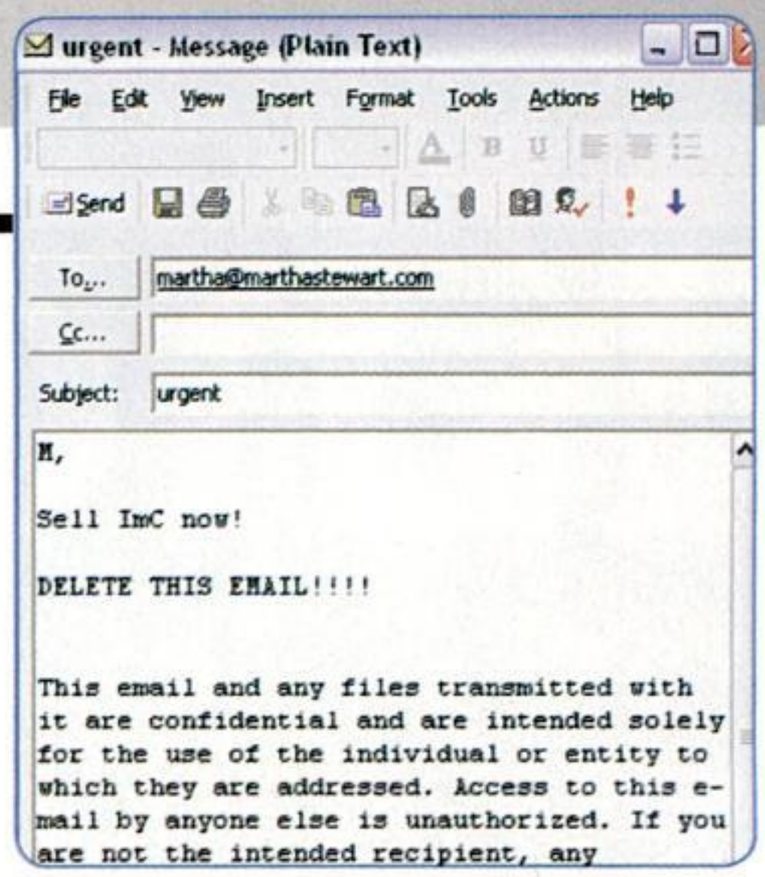
►Now click on Close in the Customize window.

To add documents, just open them, click the new menu item, and select Add to Work Menu. Life is good. To remove them—this is a little weird—press Ctrl-Alt-(hyphen). Your I-beam cursor will turn into a thick horizontal bar. Using this cursor, select your menu item, position the cursor over the document you want to delete, and press the trigger. Sayonara!

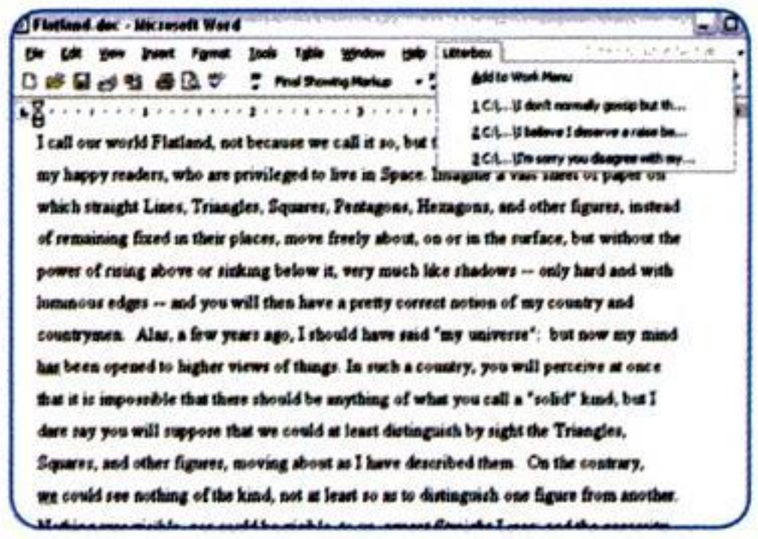
TWEAK WINDOWS MEDIA PLAYER 9

You've had your fun with *TweakUI*, the unsupported set of customization tools released by Microsoft for its operating systems. Now you can experience the rush all over again with *TweakMP*, a bundle of utilities designed to configure Windows Media Player to your taste. Go to **www.wmplugins.com**, select Plug-Ins & Skins from the menu bar at the top, select Toys and Utils from the drop-down menu, and then scroll down the list to "TweakMP PowerToy for Windows XP." One of the first things to do is shorten the time it takes the mouse pointer and menu to disappear when you go full screen (as shown in the screenshot).

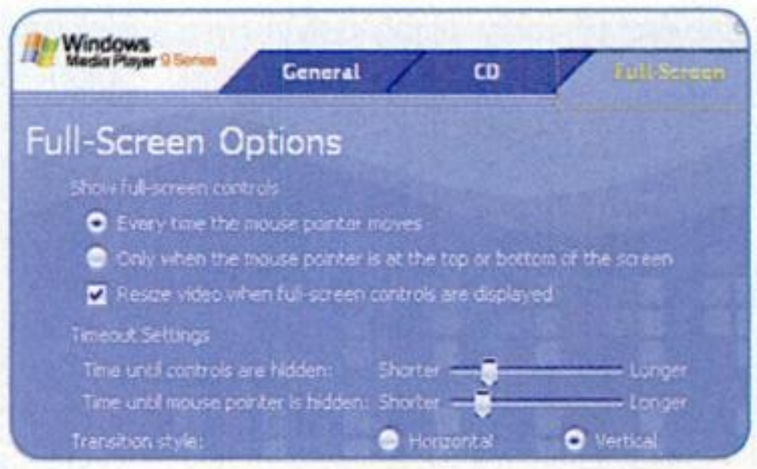
While you're at it, you can download the *Windows Media Bonus* Pack at the same location. Among other things, you'll get a badass plug-in that allows you to export playlists to Microsoft *Excel* for perusal or printing. You can, for example, simply cut the playlist from *Excel* and paste it into an illustration program for creating a CD or DVD sleeve. Get the picture? ■



You can write and send a quick e-mail using *Outlook* without having to launch the whole application.



Put your most often used documents right where you need them—on *Word's* menu bar.



Microsoft puts you behind the controls of *Windows Media Player 9* with TweakMP.

WIN!

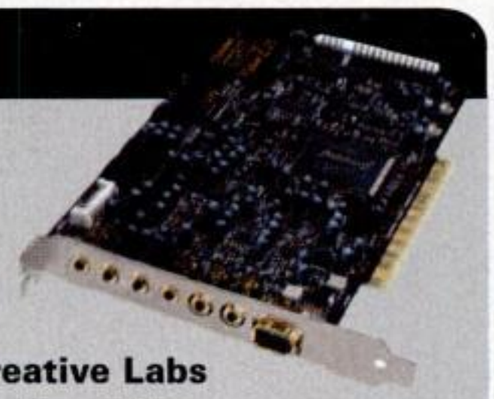
Submit the best tip, win an Audigy 2 ZS or a Radeon 9600 XT!

ATI Radeon 9600 XT

SUBMIT THE BEST TIP, WIN AN AUDIGY 2 ZS OR A RADEON 9600 XT!

Readers, it's time for you to step up. Submit your finest Windows XP tip to us at input@maximumpc.com. We'll judge the entrants and award a Creative Labs' Audigy 2 ZS to the reader who gives us the best tip and an ATI Radeon 9600 XT to second place!

Submit your tips to: input@maximumpc.com with the subject heading: Windows XP Tip Contest. See page 8 for contest rules and restrictions.



Creative Labs Audigy 2 ZS

Know Your

illustration by Ryan Johnson ©2003

20

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PC Rights

By Jason Compton

Subpoenas from movie studios. Lawsuit threats from the music industry. The Digital Millennium Copyright Act. You don't have to live in fear that your daily computing activities might land you in a courtroom. Once again, *Maximum PC* consults legal experts in order to shine a bright light on some of the shadier aspects of our digital lives. Know your rights in a DMCA world.

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Know Your PC Rights

Am I liable if my PC is hijacked by a Trojan and used to commit a crime?
If a backdoor program infects your PC and starts running a process in the background to relay fraudulent spam or launch a DDOS attack on the Pentagon, no, you are not liable. "The key element every first-year law student learns is *mens rea*—intent. Is there intent on the part of the person who has the hijacked PC?" says **Ross Kodner, president of MicroLaw Inc.** Unless you're consciously developing or beta-testing Trojans, you had no intent to wreak digital havoc.

Remember, though, that if someone comes after you, they will be armed with IP logs saying that your PC did such and such, at such and such a time. Your job will be to establish that while, yes, the computer was doing those things, you had no knowledge of its actions nor did you intend for it to behave in that manner. "Giving full access to the equipment so that others could inspect it could reveal the source of the takeover. Cooperation goes a long way," says **Richard A. Epstein, professor of law at University of Chicago.**

Presuming you clearly establish that you were an unwitting participant, you could still be found negligent of *something* if someone chose to diligently pursue the case, particularly if you could be shown to engage in high-risk activity with your PC such as downloading software from dubious sources or not running a virus scanner. **Eben Moglen, professor of law at Columbia University Law School and general counsel for the Free Software Foundation** advocates that PC owners push their homeowner's insurance carriers to protect them from PC mishaps just as auto insurers protect their cars. "Insurers have to decide what the actuarial numbers are. It should be an insurable risk," he says.

I ripped a movie from a commercial DVD and placed it in my Share folder so I could access it through the wireless network in my house. But this made it accessible to others on the web. If they download it, have I committed a crime?
First things first—that's some pretty sloppy LAN management, pal. Internal shared drives are for internal shares. Your external share folder is for P2P. Keep them separate, and keep safe.

Assuming you made such a slip, however, bear in mind that you may have committed a crime just by ripping the movie in the first place. The DMCA doesn't want to let you decrypt and rip DVDs. By the letter of the law, "taking the DVD out from its protective cover is criminal, and putting it where you know others will want it is a second offense," explains Richard Epstein.

Ross Kodner warns as well that as publications ranging from *Maximum PC* to the *Wall Street Journal* hammer home concepts of network security month in and month out, courts may increasingly find that "reasonable persons" shouldn't make these sorts of dumb mistakes and could, in fact, be found liable in a civil trial. If you're running P2P software, it could be reasonably assumed that you know how your share folder works. On the other hand, if the DVD image is being grabbed by people driving by and muscling into your wireless LAN, then they are likely in the wrong and you are in the clear.

Serving up the movie is quite likely against the law as well if you knew it could happen. "Under the 'contributory infringement' doctrine, you can be held liable for copyright infringement if you have knowledge of someone's infringing activity and you either induce or materially contribute to such infringing activity," says **John F. Delaney, partner at the law firm of Morrison and Foerster LLP.**

"If your intent was to make it available for yourself, if you're just doing your own thing, I really don't think you're going to violate the law, but that may not keep the movie or music industry from suing you because they may want to intimidate people by the mere threat," says **Jason Schultz, staff attorney for the Electronic Freedom Foundation.** "If that happens, call the EFF."

OK, once and for all, does the Digital Millennium Copyright Act (DMCA) make it illegal for me to make a backup of my game CD, audio CD, or movie on DVD?
Sorry, but the answer is still not cut and dried. Traditional copyright law says that backups for personal use are legitimate and protected. That's the Fair Use provision at work for you.

> *"Moglen advocates that PC owners push their homeowner's insurance carriers to protect them from PC mishaps just as auto insurers protect their cars."*

The problem is that the DMCA, as written, says that cracking copy protection in order to make a backup is not legitimate. "Making a backup copy itself isn't illegal. Cracking the encryption system to do so may be," says **Mark A. Lemley, professor of law at Boalt Hall School of Law, UC Berkeley.**

So most audio CDs and many game CDs are still in the clear. DVDs are always protected, however, and an increasing number of audio and game CDs are as well. "For DVDs, no one really knows" what the law says about backups because of conflicting court rulings, says Jason Schultz. "It may have to go all the way to the Supreme Court."

Because the DMCA's strict language contradicts Fair Use provisions already on the books and declares fundamentally legitimate tasks like backing up software and playing a DVD on a Linux PC to be wrong, legal experts believe the current chilly environment for consumers, where they are implicitly threatened with lawsuits for behaving like responsible power users, can't survive. "The inevitability is that court interpretation is going to loosen [the DMCA] to make it practical," says Ross Kodner.

Eben Moglen is even more succinct. "There are individuals in society trying to frighten customers," he says. "Just tell them to drop dead."

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"Just one more game, honey." Yeah, right. Like she believes you. She knows you're infatuated with your P160 case. You lust after its anodized aluminum body, removable motherboard tray, swiveling control panel, and isolated HDD bays. Hey, we understand. Your girlfriend, alas, may not. To learn more about how our award-winning products can help you create a truly irresistible computer, visit **www.antec-inc.com**

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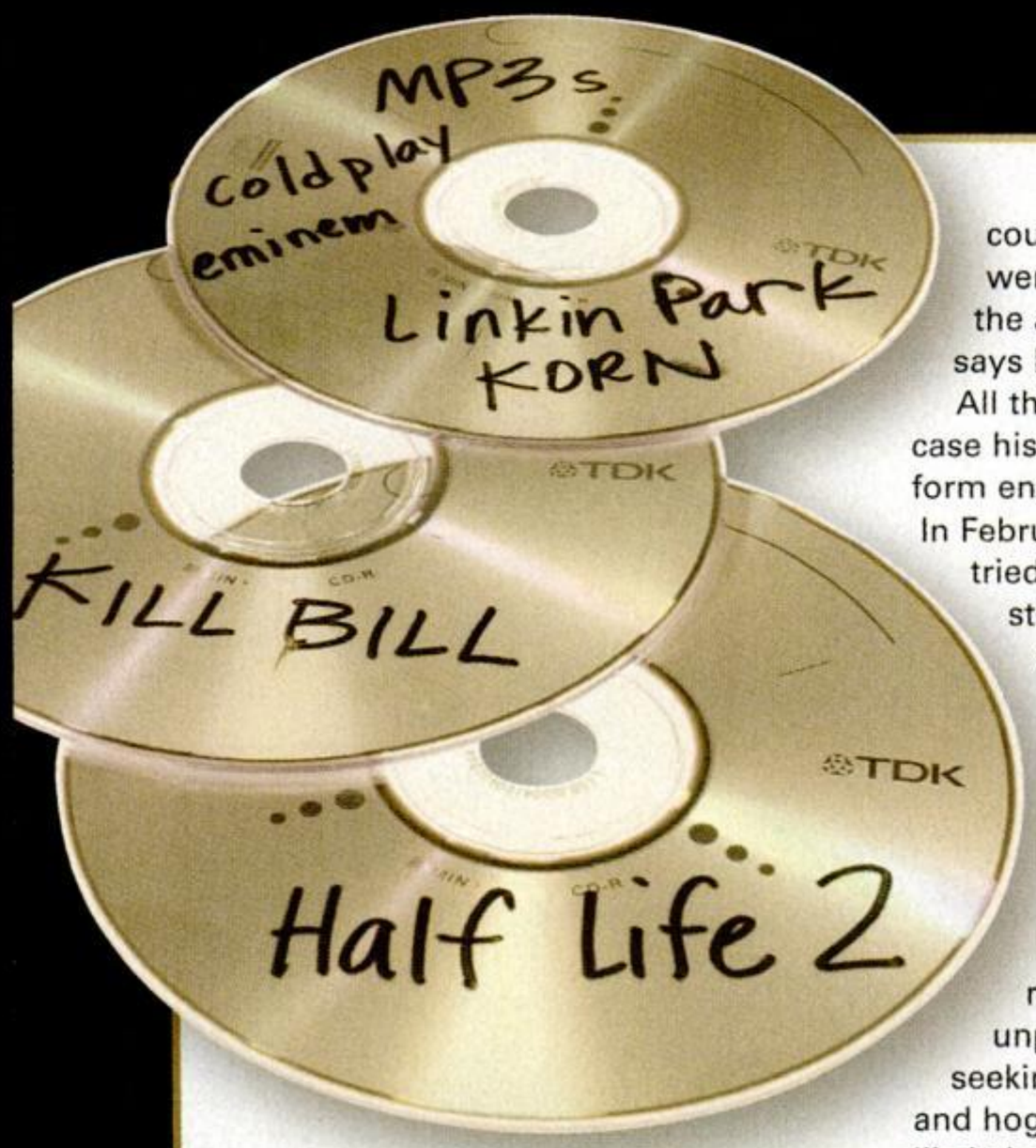

I popped a wireless card into my laptop, and logged into an unsecured wireless network, probably from my next-door neighbor's house. Is it a crime for me to surf this way?

That depends. Your neighbor might be the type who leaves coolers of cold drinks outside on a hot day for the neighborhood, and he's told the block that the same generosity extends to his WLAN. He might run a neighborhood hotspot, as many people do on the Boingo network, or post on wireless LAN enthusiast sites. In this case, siphon signal to the eyeballs.

If, on the other hand, you have not been given permission, you're likely committing a crime. "You are responsible just as if you used his telephone wire [which would in fact be the case if your neighbor were on DSL]. Nothing unique here," says Epstein.

If your neighbor's on a cable modem, anti cable-stealing regulations could be brought to bear. "If I were a prosecutor, that would be the avenue I would be exploring," says Kodner.

All that said, there is precious little case history establishing where poor form ends and legal wrong begins. In February 2003, Stefan Puffer was tried on computer crimes charges stemming from his "wardriving" exploits accessing government and commercial wireless LANs. The jury promptly acquitted Puffer because it was not proven that he was intentionally doing harm, especially given he was busy demonstrating to a reporter the security flaws in unprotected WLANs. Deliberately seeking out another person's WLAN and hogging bandwidth all day would likely be a different story. While the airwaves may be shared, hopping on someone else's WLAN means you are using a router and broadband connection they pay for expressly for their own personal use. It's a digital trespass, plain and simple.

I wrote a piece of software and released it under the GNU Public License. Someone took my software, added some features, and released it for sale—without the source, without my name, without the GNU Public License! How can I put the smack down on this boob?

The GPL does a lot of things. One of the things it does is expressly allow someone to take your program, put a shiny wrapper on it, and sell it for a hundred million dollars—as long as they preserve the rights you have staked out for yourself in the GPL, which include keeping the program and its direct descendants an open-source creation for now and evermore. If your copyright and your source have disappeared, then you have a clear case of infringement and can sue. There's a good reason that this rarely happens, though—the GPL is so intricately written that it's very difficult to contest.

"More often, you just need to send a letter or e-mail [to the boob] saying 'I own you,'" says Schultz. "They think they will get away with it and no one will notice, but once you shine the spotlight on them, they realize they have to do the GPL rights."

For the authoritative answer, take it from Mr. Moglen and the Free Software Foundation, which wrote the GPL in the first place. "Bring an action for infringement of copyright. Permission extends only to distributing under the terms of this license... so if you turn it into a proprietary program, at that point you're infringing copyright," he says. If you think you need additional help enforcing the right of your software to be free, you can assign your copyright to the FSF, which will actively pursue infringers.

I downloaded some music from iTunes, but I don't have an iPod. If I burn the track to a CD, rip it, and put it on a different player, could it be construed as stealing?

No, this is just as legitimate as ripping a track from a CD you purchased. You did, after all, pay for the right to play the music and thus far the law protects your right to rip, spindle, fold, and mutilate purchased music into the format of your choice for your own recreational use. "The only question is whether you would be violating any part of Apple's license, and I can't see anything [in the license] that prohibits you as long as it is personal and not commercial use," says Schultz.

"Indeed, there is some reason to believe that if the sale only allows you to play on [Apple products] it would run afoul of antitrust laws by precluding competition in the player market," adds Epstein.

If DVDXCopy is found to be in violation of the law, does this make me an, uh, retroactive criminal?

You wouldn't be going to jail for having been on the registered user list, if that's what you mean. But if such a day comes to pass and the Fair Use provisions of copyright law are weakened further, then it is very possible you would suddenly find yourself in possession of contraband materials and forbidden fruit.

> *"If you're running P2P software, it could be reasonably assumed that you know how your share folder works."*

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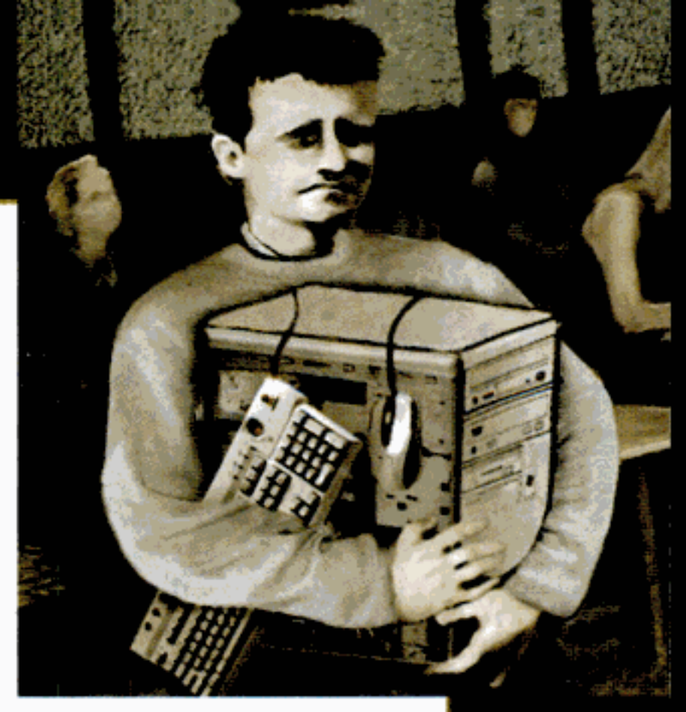
Know Your PC Rights



"If *DVDXCopy* is found to violate the DMCA, yes, technically it could mean that everyone who used it violated the DMCA," says Schultz. Each and every DVD-R in your house could be a separate violation if someone wanted to get really nasty about it. Normally laws cannot punish behavior that took place before they were passed, but in this case the DMCA existed before *DVDXCopy*, so it would not be a true retroactive punishment. That said, the lawsuit against 321 Studios, author of *DVDXCopy*, is more about getting the product off the shelves than about punishing users.

If 321 loses, Kodner thinks the scenario would play out much like the criminalization of certain drugs, like cocaine. Public notice would be given requiring people to dispose of the illicit material during a grace period, after which possession and further manufacture would be a crime. Reports that the Motion Picture Association of America's (MPAA) Jack Valenti plans to rent a U-Haul and do doorstep pickups of your DVD-R spindles could not be verified at press time.

Is it legal for me to use a software program to record the audio track from a DVD movie so I can listen to it with a portable player?

You're swimming with the DMCA sharks again. Fair Use says yes, but the DMCA says that anything that messes with DVD content is a potential problem, because the DMCA is so picky about circumventing encryption and copy protection, which you have to do in order to get at the DVD's audio (unless you use the analog line-out jack to record the soundtrack, which doesn't involve decryption). "The process of getting it could violate the DMCA, but if you legitimately bought the DVD, you have every right to listen to it on a portable player, be it soundtrack or dialogue, under copyright law," says Schultz.

"What the DMCA does is create a paradigm shift in thinking—you presume that what you're doing is wrong rather than presuming that what you're doing is OK until someone tells you it's wrong," says Kodner. No test cases have hit the books for this problem yet, though. Prosecutors and law firms don't waste their time with people who have extensive ripped libraries of their own material; they go after people who are swapping with others. So, again, the law is in conflict and the courts are so far silent.

I know buying pharmaceuticals on the Internet without a prescription is sketchy and dangerous. But if I do it, who is committing the crime, me or the pharmacist?

Finally knuckled under to that "generic Viagra delivered from India!" spam, huh? Don't worry, it happens to the best of us.

The pharmacist is certainly committing a crime, although aside from blocking shipments at the border, there may not be much the government can do about it. "The institution will feel the brunt of any sanctions. The question of whether [the seller] is subject to our jurisdiction is controversial but if he actively solicits business in the States, he will be so subject if we can find him," says Epstein.

You could be in trouble yourself, depending on what you're getting your hands on, and if it appears that you're intentionally flouting the law. Possession and transport of controlled substances is a crime. If you are obtaining dangerous substances like narcotics or drugs expressly not authorized for sale in the US, expect some trouble if someone discovers your stash. "If it's made clear from the web site that it is medication not authorized for sale in the US, I think there would be responsibility on the part of the purchaser," says Kodner.

My ex guessed my e-mail password, logged on as me, and read my e-mail. Can I bust him/her?

Short answer: Yes. Long answer: Yes, *but*.

Clearly it's a digital trespass, but a criminal act has not taken place unless your ex does a heck of a lot more than reading the love poems from your new sweetheart. "From a civil perspective, you can sue anybody you want, but you're not going to make a case unless you can show actual damages," says Kodner.

> *"What the DMCA does is create a paradigm shift in thinking—you presume that what you're doing is wrong rather than presuming that what you're doing is OK until someone tells you it's wrong."*

"It is a violation of the Computer Fraud and Abuse Act (CFAA) if [the violator does] more than $5,000 in damages. If not, it's probably OK," says Schultz. Because even guessing a password could be considered hacking under CFAA, the violator could be held liable, but first you'll have to build a case for damages done, and your ex learning that you're recycling the nickname "sugar booger" won't be enough. If the jilted lover used the time to, say, send some e-mails as you to your boss and co-workers telling them that they should rot in hell in various anatomically impossible positions and you get fired as a result, you can show proof of injury. If your ex gets access to your finances and shifts things around maliciously, again, you have some damages. Even time spent inspecting your system for trouble after discovering the intrusion could be rolled into the total.

But if you ask us, you should simply be a little more judicious about your passwords when a former lover moves out. ■

GAME OF THE YEAR

Design matters in our first ever Gaming Softies

Despite the absence of *Half-Life 2* and *Doom 3*, 2003 was a spectacular year for PC gaming, making our selections for the first annual Gaming Softies rather difficult. How to choose just three games, given the year's multitude of outstanding offerings? After many heated discussions, we realized that progressive design, in terms of both genre-breaking play mechanics and technology, are more important to *Maximum PC* than sales or hype. Herewith we present the top three games of 2003.

GAME OF THE YEAR

PLANETSIDE

***Planetside's* Ultimate Sacrifice: A solo charge into the heavily defended control center to capture a base makes for great multiplayer drama, but most ultimate sacrifices do. Hey, somebody's gotta do it.**

When something new comes along, it's important to note the significance of the change. Thus, we call your attention to *Planetside*. For starters, it's the first ever massively multiplayer first-person war game. Three different factions fight across 10 continents for control of the planet Auraxis. In addition to basic infantry combat, *Planetside* boasts tanks, fighters, bombers, ground support craft, and even armored personnel carriers.

But there's more to *Planetside* than maintaining battlefield superiority. For example, a set of tools gives proven leaders (you have to earn your stripes) the ability to collaborate and orchestrate every battle, from continent-wide struggles down to three-squad skirmishes.

Like many massively multiplayer games, *Planetside* experienced problems upon its launch in May 2003, which makes its current excellent state—the result of a committed, hardworking development team—even more impressive. Initially, there was little incentive for players to defend bases, the faction-specific weaponry was unbalanced, and the air weaponry felt inadequate. Since launch, however, SOE has fixed, corrected, balanced, and enhanced. Capturing (and holding) bases is absolutely vital to success now, and each factions' weapons feel equal. The company has also released three free new vehicles. The result is a deep, fun, multifaceted war game unlike anything we've played before.

No other game gives us the feeling we get when standing on a rampart in *Planetside* with 30 buddies as 200 enemies charge toward our position. That's Game of the Year worthy.

www.planetside.com, $11/month
(Free 30-day downloadable trial)

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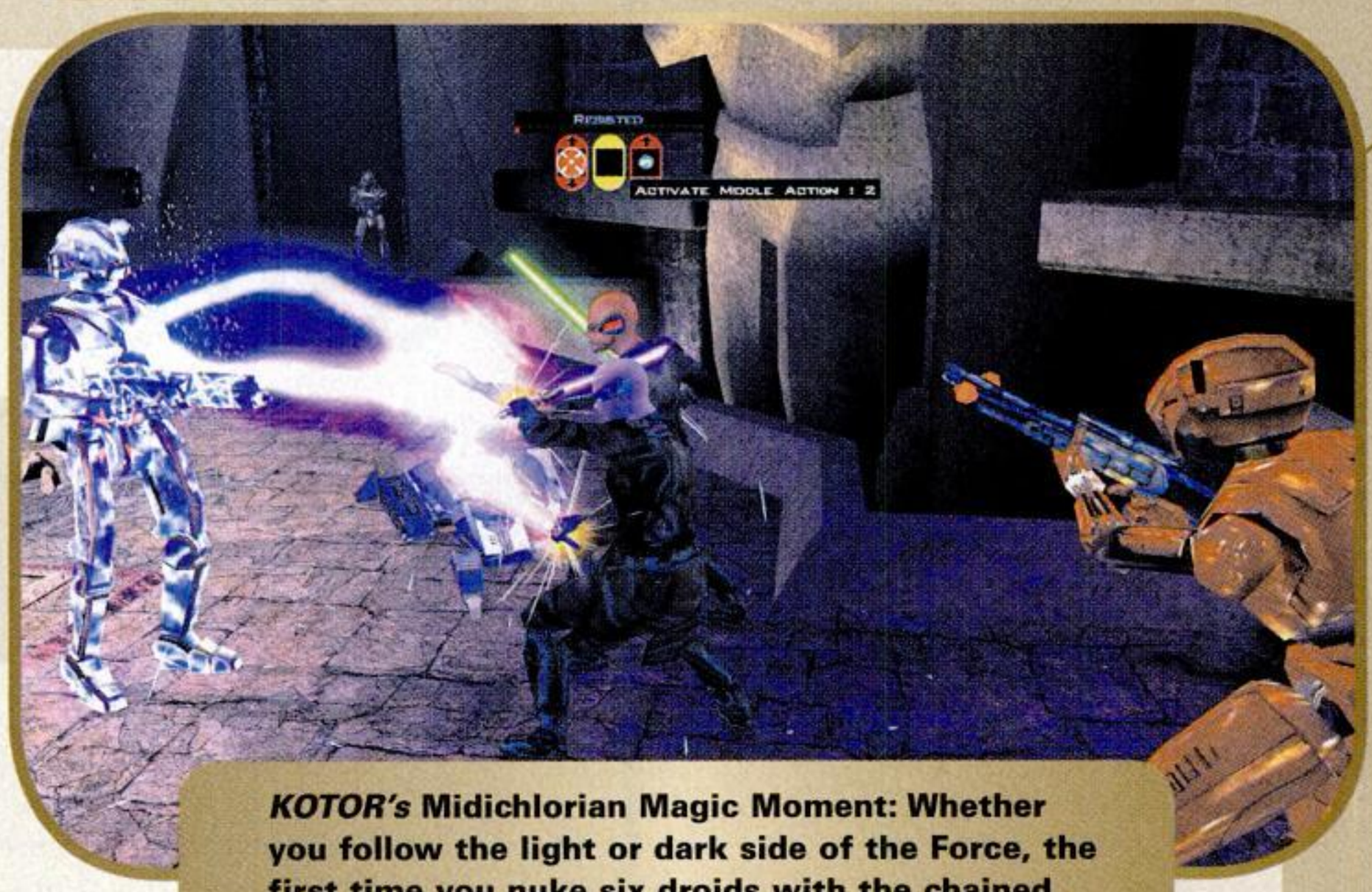
SINGLE-PLAYER GAME OF THE YEAR

STAR WARS: KNIGHTS OF THE OLD REPUBLIC

Halfway through *Knights of the Old Republic*, you get enlisted to defend a man accused of murder on the planet Manaan. Lose the trial and a seemingly innocent man gets executed. Getting him off is no easy feat, and even the crustiest gamers will feel bad about losing this "mission" when the defendant gets dragged off to death... or worse.

Welcome to the new age of the RPG ushered in by Bioware and LucasArts. In *KOTOR*, plot, action, and human nature take a front seat to the detached linearity and unoriginal role-playing the genre has espoused until now. Bioware's sophisticated, branching design allows you to play however you'd like, ensuring that no two players will experience the same progression of events.



***KOTOR's* Midichlorian Magic Moment: Whether you follow the light or dark side of the Force, the first time you nuke six droids with the chained effects of your upgraded Destroy Droid power, you'll cackle gleefully.**

The finest praise we can give *Knights of the Old Republic*, however, is this: After playing through it in 50 hours, we're already playing it again. In 10 years, this is one of those classics we'll get misty-eyed over.
www.lucasarts.com, $50 *(reviewed on page 70 of this issue)*

TECHNICAL EXCELLENCE

DEUS EX: INVISIBLE WAR

Where most games have become more and more scripted, giving gamers "moments" of exciting yet utterly predictable events that unfold in the same manner every time, *Invisible War* embraces "emergent" gameplay. Instead of scripting a sequence, the developer creates a situation, then gives the player tools to develop his own solutions.

Your choices shape the way you play, whether you charge into a nest of enemies with guns blazing, stealthily slink around a battle, or take advantage of the Havoc physics engine and the numerous props scattered around every room to create a distraction. Because of the game's dynamic faction system, which can alter the way every NPC in the game interacts with you, you can truly play *Invisible War* multiple times without playing the same game twice.
www.deusex.com, $50 *(reviewed this month on page 72)*

***Deus Ex'* Acting Out: You could simply shoot this lawyer in the head, but we drugged him, shocked him, and then blew him up. Of course, given *Deus Ex'* open-ended nature, you could just as easily let him live. Who says games encourage violence?**

HONORABLE MENTION

CALL OF DUTY: The finest WWII shooter we've played.
RISE OF NATIONS: Combining *Risk* and a flawless historical RTS was brilliant.
SIMCITY 4 DELUXE: The ultimate city-building sim. ■

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Ask the Doctor

Symptom ▶ Diagnosis ▶ Cure

IS TEMP REALLY TEMPORARY?

I'm running Windows 98. I read that you can safely delete the contents of the C:\Windows\Temp folder because the stuff in there is temporary and just takes up disk space. Is this true? Are there any other "temporary" folders and files that can be safely deleted? And can this be applied to Windows 2000 and XP?

—CHRIS LOOI

It's absolutely true. Unless you're intentionally storing stuff in there, the temp directory shouldn't hold anything other than application cruft that you really don't need anymore. Windows XP and Windows 2000 have temp directories for each profile within the OS, so the easiest way to clean them out is to use the Disk Cleanup wizard. You can access it by going to Start>Programs>Accessories>System Tools>Disk Cleanup. It will check all the temp files on your system and delete any excess.

BURNED CD BLUES

Sometimes burned CD-Rs just don't work well. Luckily, the Doctor has a few tips and tricks that can get your data moving again.

I recently made three CDs for a friend. All three were data CDs containing miscellaneous files and programs. Explorer shows the entire contents of the disk. The disk properties show the amount of data occupying the disk, along with the amount of free space. The used space shows 618MB and the free space shows 654MB, for a total of 1.24 GB. I used Sony CD-R 700MB disks.

When my friend tries to open a file, a directory, or run a program, he gets a message saying there is no CD in the drive, or that the file cannot be opened. The burning software used was *Nero 6*. The drive used was an Artec 48/12/48 CD-RW. Can you tell me what's causing this?

—JACK HILL

There are a number of things that could be going awry here, but the Doctor, who often refers to himself in the third person, thinks that if you and your chum follow these tips, the problem will vanish faster than David Blaine from the public spotlight.

First, go to http://support.microsoft.com/default.aspx?scid=kb;en-us;Q320174. You'll find a Windows XP update that fixes a bug that could prevent your discs from being read in earlier operating systems, and sometimes Windows XP itself.

Second, we found the initial release of *Nero 6* to be horribly buggy. Fortunately, Ahead is very aggressive with updates and product improvements. Go to its web site and download the latest update to *Nero 6*. The update will probably be more than 30MB, but it's worth every bit.

If these fix-its don't solve the problem, the finger of blame is likely pointing at compatibility issues between the media you're using and your friend's optical drive.

WHEN WINDOWS DUMPS ON YOU

How do I view .dmp files? I keep getting BSODs and I think the cause may be a bad driver. I'd like to pinpoint the culprit so I can update and replace the correct driver; since I've already updated all my drivers, I need to know which one I should roll back. I think the information I need is the C:\WINDOWS\Minidump.dmp file, but I can't analyze it.

—ROB DUTKIEWICZ

The easiest way to peek into a .dmp file is to right-click it, select Open With... and then scroll down to Notepad.exe. The .dmp file will open in *Notepad*, and you'll be able to mull through its contents. If nothing else, you should be able to figure out what application caused the crash, which could help you find the culprit.

> ***"SINCE I INSTALLED THIS STUFF, MY MONITOR OCCASIONALLY FLASHES A LOVELY TRANSLUCENT MAGENTA COLOR."***

PSST, MISTER, WHAT'S THE PASSWORD?

I got a PC from one of my friends. It's running Windows 95 and has a password. Do you know of a way to get rid of the current password?

—MICHAEL HAYDON

Well, unless the PC fell off the back of your friend's truck, the first thing to do is ask him for the password. If he's forgotten it, there are more advanced password-finding techniques you can try. The solution to your problem depends on the type of password the PC is protected with.

If we're talking about a BIOS password—one that you're prompted for before Windows starts—you'll need to open the case and locate the jumper that lets you load BIOS defaults. It may also be called the BIOS Reset. Check your motherboard's manual if you're having trouble finding it, and be sure to follow the proper procedure for BIOS resetting.

If you're stymied by a password within Windows 95 itself, we can tell you exactly what to do about it. Are you ready? OK then, all you need to do is type another user name, create a password for yourself, and press OK. Windows 95 security boggles the mind, doesn't it?

WHOSE SWAP FILE IS IT, ANYWAY?

Does Windows leave any important data in the swap file between the time it shuts down and starts back up again?

I have a dual-boot machine—Windows 2000 Pro and XP Pro—and I often defrag one partition while I'm in the other. Sometimes while doing this I'll just delete the swap file to save time and force Windows to create a new one in a contiguous space. I've not noticed anything odd, or I should say anything beyond the normal Windows odd, but I was wondering if this is a generally bad move.

I know all about *Diskeeper* and its boot-time defragging. I just haven't bothered with it as this system has worked well for me so far.

—CHUCK SKELTON

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There's nothing important saved in the swap file for any version of Windows if you shut down the PC normally. Because the swap file is similar to RAM, Windows doesn't expect to find anything there the next time you reboot. In fact, you can even set Windows to zero out the swap file to obliterate any errant data that might be stored there.

Defragmenting an OS's partition from within another OS is definitely not the recommended procedure, but it works. You might get better results by using a defragger that's more aware of the OS and will place the swap file near the inside edge of the drive platter, where access times are lowest, but that's a minor speed tweak.

MAGENTA MONITOR MONDAY

Recently I installed a new mouse and a Radeon 9800 Pro 128MB. Since I installed this stuff, my monitor occasionally flashes a lovely translucent magenta color. I'm still able to see what I'm doing, but it does become more difficult to run games. This problem can persist anywhere from a minute to a few hours. I have an older Hitachi SuperScan Pro 620 monitor. Is it dying? Or is this a result of a faulty videocard?

—ED12MANY

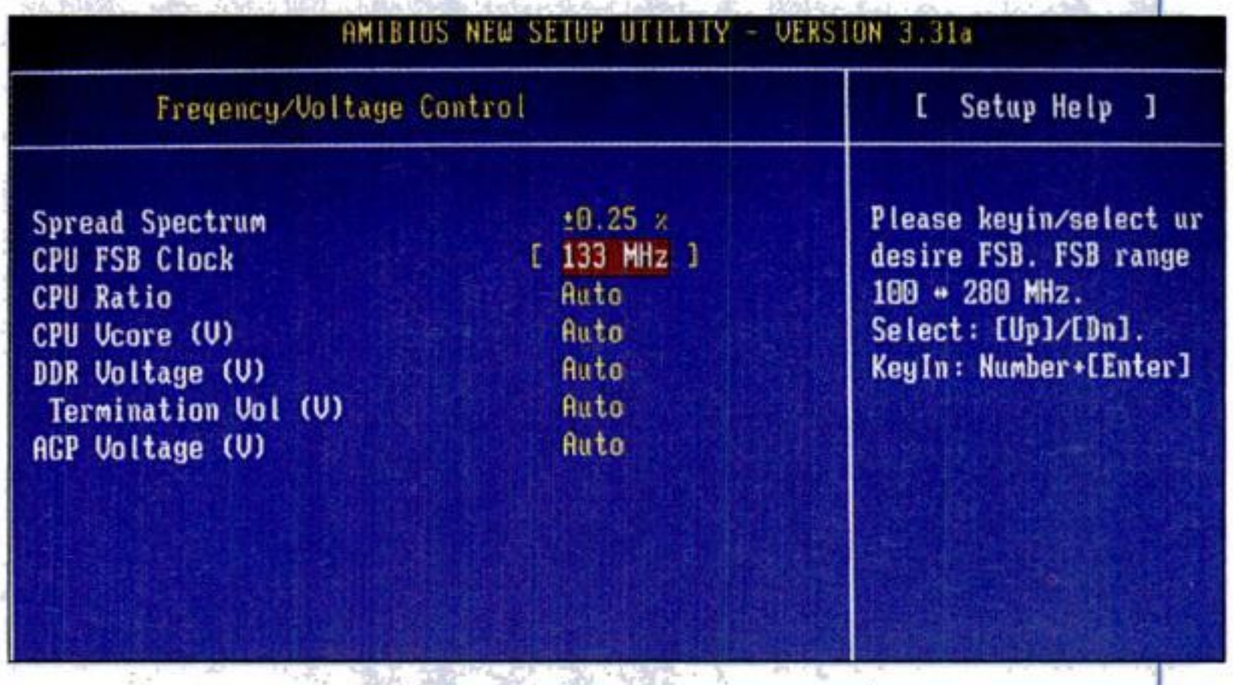
The very first thing you should do is check both ends of your monitor cable. The Doctor himself has cursed 'failing' monitors several times, only to realize he knocked loose the cable connection on the back of the monitor.

Assuming your monitor cable is actually plugged in—if it wasn't, the Doctor won't tell—there is an easy way to determine which device is failing. All you need to do is connect the monitor in question to another computer. If it's still affected, the monitor is bad. If it's OK, try plugging a different display into the original PC. If that monitor also has a magenta cast, you can safely assume that your videocard is defective. It could also be a faulty monitor cable, but because the problem is intermittent, we think that's unlikely. ■

CLOCK SPEED CONUNDRUM

I have a P4 2GHz Northwood A. The PC runs OK, but when I look at the System Properties Control Panel, it says something confusing. At the top it says that I have a 2GHz chip, but right below that it says it's 1.95GHz. What's the story?

—JESSE PETERSON



If your CPU's clock speed is off, you can check the BIOS to see if your frontside bus speed is correct.

The likely culprit is a conservatively clocked motherboard. A 2GHz P4A is theoretically the result of a 100MHz frontside bus paired with a multiplier of 20. Not all motherboards will run the busses at exactly 100MHz, though. Intel motherboards, for example, tend to be conservative and generally run the frontside bus (as well as PCI and AGP busses) just under spec at, say, 99.5MHz. This errs toward reliability. Other board makers may actually clock it higher at, say, 100.8MHz, which gives them more performance at the expense of reliability. It's also possible that your motherboard's clock is simply out of whack, leading to the loss of 50MHz. Another outside possibility is that you have a counterfeit Pentium 4, but that's a long shot.

Don't trust System Properties as it just doesn't provide enough information. Instead, download the excellent (and free) *CPU-Z* from www.cpuid.com and run it. If the FSB is reported as 98MHz, your board is either intentionally underclocked by the manufacturer, or someone manually set it to the incorrect speed. If it's higher, at, say, 124MHz, you're probably the victim of an unscrupulous vendor who overclocked a 1.6GHz Pentium 4 to 1,984MHz by cranking up the frontside bus speed.

If you're a little confused by *CPU-Z*, you can also download Intel's free *Frequency ID* utility (www.intel.com/support/processors/tools/frequencyid/). This utility will verify what CPU you have and whether it's overclocked or not. If it's simply a motherboard that's underclocking the CPU, you shouldn't worry—50MHz won't kill you. If it's overclocked, however, then scream bloody hell.

SECOND OPINION

F-LOCK IS THE WORST FEATURE EVER

Having recently bought a Microsoft wireless keyboard and discovered the F-Lock issue [F-Lock key is not programmable and the startup condition has the new features on and the F1 through F12 functions enabled], I was pleased to see that Will Smith also complained about this in his review of the product in the December issue. Had I seen that review I probably wouldn't have bought the keyboard because I spend all day using the function keys.

Fortunately, Jason Tsang at www.mvps.org/jtsang/flock.html has an elegant solution for Windows 2000 and XP users who still rely on the function keys. He provides a free set of files to remap the 12 function keys, reversing each one's code so that the default state is the opposite of the way it shipped. His files worked great, and now I never have to touch the F-Lock key. The computer still boots with F-Lock off, but with the functionality of the F1–F12 keys reversed, thus each does exactly what I expect. The detailed explanation is at the link above along with zipped files for downloading the fix.

After fixing the problem, I contacted Microsoft and complained about the way the keyboard is initially mapped, and that the F-Lock key is not programmable. I gave them the link to the solution and suggested that this information be included in the Microsoft Knowledge Base.

—JIM HEIMAN

From the rolling hills of Northern California comes this month's action-packed installment of Ask the Doctor. With no thought to his own mortal peril, the Doctor bravely solves your PC problems. If you've got PC questions, e-mail them to **doctor@maximumpc.com**. Just remember that the Doc can't answer every question that's submitted, just the ones that appear in the magazine.

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How To... A step-by-step guide to tweaking your PC Experience

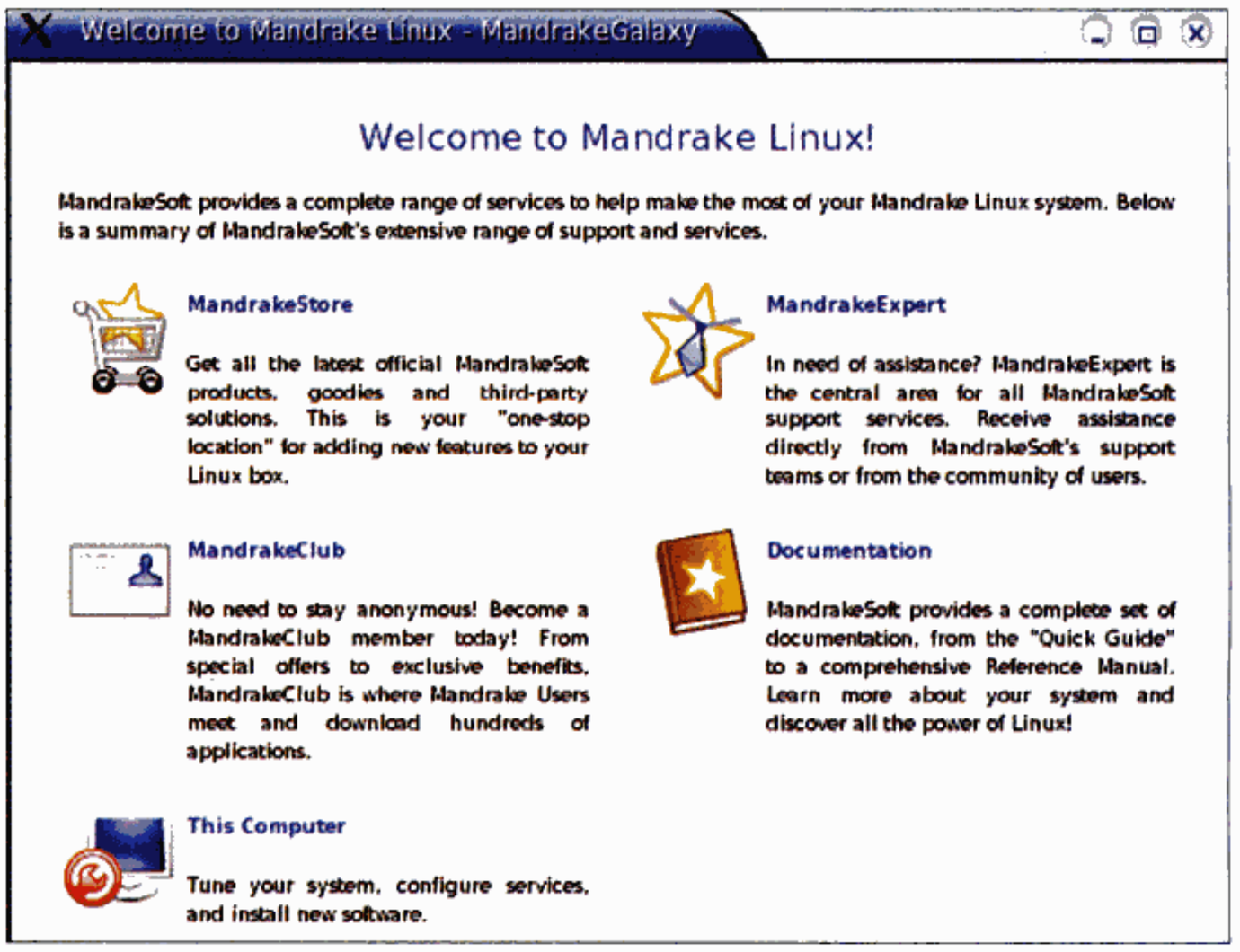
SAFELY INSTALL LINUX on Your PC

Installing Linux is easier than ever before. Our guide will help you avoid potential pitfalls

MAXIMUM PC
TIME TO COMPLETION
2:10
HOURS MINUTES

BY MARK EDWARD SOPER

Whether you've been using Windows so long that you remember when it didn't even support 386 processors, or you just recently cut your teeth on XP, there are still benefits to be had from an alternative operating system. From casual users to hobbyists to IT professionals, more and more people are adding Linux to their Windows-based systems, or switching to Linux completely.



TRY THEM FOR FREE!
Want more information on the various Linux distros? Set your browser to **www.distrowatch.com** for news, reviews, and links to the latest distros and Linux apps.

Linux has been a popular server OS for several years, but using it as your desktop OS used to require substantial technical savvy. This is slowly changing. Most versions of Linux, called "distros," are now freely available for download, and much easier to install. Linux PCs can do everything that most Windows PCs do, from browsing the Internet and checking e-mail to playing games. There are even freely available *Office* and *Photoshop* clones.

Why would anyone want to fool with Linux? There are several perfectly valid reasons. Most Linux distros have more modest system requirements than comparable versions of Windows, so if you have an old PC lying around and want to set up a cheap web-browsing station, Linux makes a perfect choice. On the other hand, if you're a programmer and want to completely customize your OS, Linux source code can be modified to suit your specific needs. Lastly, while Linux isn't right for everyone, it's worth a power-user's while to gain some experience with it.

In addition to the downloadable versions of Linux, dozens of commercial distros are bundled with a multitude of utilities and full-blown programs at most computer and electronics superstores for less than $100. System requirements for most desktop versions of the OS are low—think Pentium II with 128MB of RAM—although some, such as Mandrake Linux, recommend 1GB of RAM and a 1GHz processor when used with a GUI such as *KDE* or *GNOME*.

We chose Mandrake for its easy install process, excellent hardware detection, and compatibility with both NTFS and FAT32 partitions. This month, we'll cover the process of installing a downloadable version of Mandrake Linux 9.2 on a system running Windows XP.

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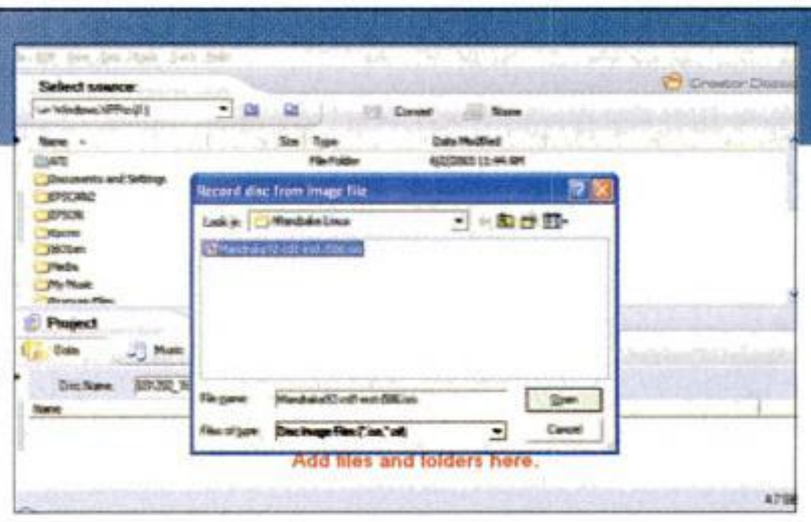
LINUX PREPARATION



First, go to **www.mandrakesoft.com** and download the latest ISO version of Mandrake. ISO files are bit-by-bit copies of the data stored on a CD-ROM. There's usually more than one disk available for download, but you only need the first one for a basic install. There's no need to download a 600MB file full of source code if you don't intend to write any programs.

After you download the ISO image file used to store the distro, create an installation CD using a CD-mastering program that can burn ISO files to a CD-R. Both *Easy CD Creator* and *Nero* can burn ISO files. Most downloadable Linux distros are bootable ISOs.

Like any operating system, Linux must be installed on a primary hard disk partition. Most Windows systems have a single hard disk with one giant partition. Most recent Linux distros, including Mandrake Linux, can resize the existing FAT32 partitions to make room for an additional primary partition for booting Linux. If your drive is formatted using NTFS, you should get a third-party Windows app, like *Partition Magic* (**www.powerquest.com**), to resize your partition before you install Linux. (The Linux utility for NTFS resizing is flaky at best, and you don't want to lose your data.) If your main hard drive has less than 5GB of free space, you're probably better off installing Linux on a separate drive.

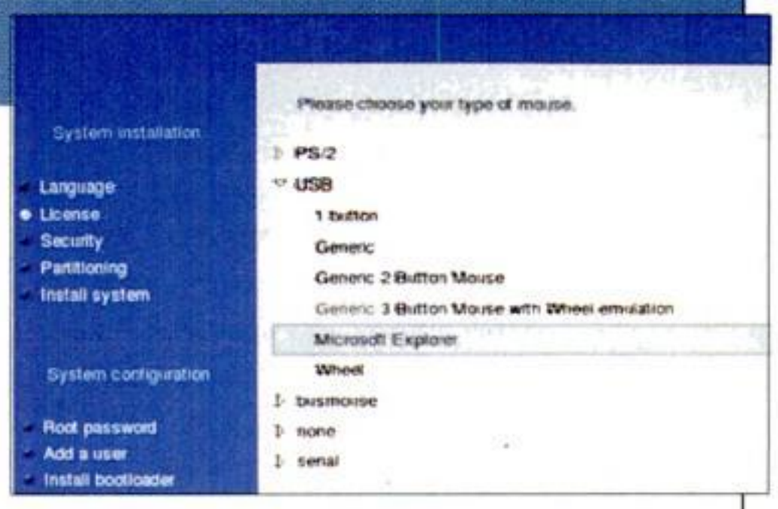
Back up your system with a product designed for disaster recovery, such as *Norton Ghost* (**www.norton.com**). If your Linux install goes poorly, you may need to reinstall both Windows and Linux to get going again!

Before you start the Linux install, make sure you run *Scandisk* and *Defrag* from inside Windows. You should also check your Linux distro's web site and make sure it supports all your hardware. Most distro vendors list tested and certified hardware with links for updated drivers on their site.

SUSSING OUT YOUR SYSTEM'S MYSTERY HARDWARE

To get the details about your system's internal hardware, use Microsoft System Information (MSinfo32) or a third-party program such as *SiSoftware Sandra* (**www.sisoftware.co.uk**). Make absolutely sure you write down the name of your videocard, chipset, mouse, soundcard, and network card!

STARTING THE INSTALL



Insert the Mandrake Linux CD and reboot your machine to start the install process. If your system won't boot from the Linux CD, restart your system and enter the BIOS setup program to check your boot sequence. The boot sequence is often listed in the Advanced Setup or BIOS Features menu, or a submenu of one of these menus. Adjust the boot order so that the CD-ROM drive boots before the hard disk, then save the changes.

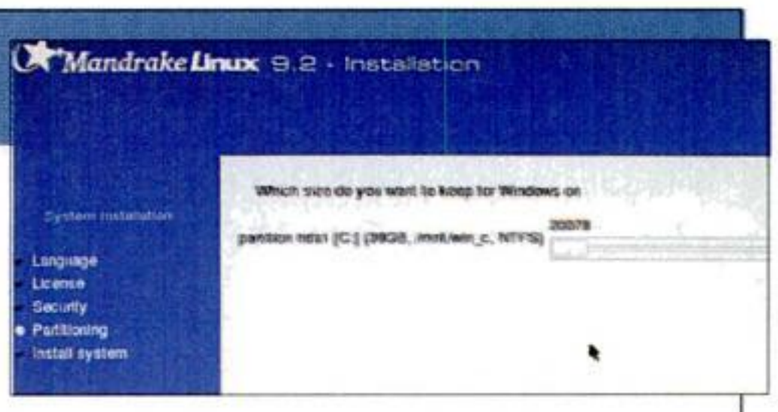
If your system still doesn't boot from CD, make a boot disk per the distro's instructions and start your system with it.

The Mandrake Linux installation program briefly displays a screen with a prompt to press Enter to start the installation. Advanced options can be changed by pressing F1.

Follow the prompts to select the region and language, and to accept the license agreement. Use the arrow keys and spacebar if your mouse is not recognized. The Mandrake installation program recognizes mice and pointing devices connected to PS/2, USB, serial, and even the long-obsolete bus mouse port automatically. Submenus enable you to select from a wide variety of serial mice and touch tablets. Make any necessary changes before continuing.

After loading drivers for your system, the Security Level menu appears. The default setting—Standard—is suitable for our purposes. Selecting a higher security level will make administering your first Linux box needlessly difficult, while setting a lower security level will leave your system vulnerable. After you've set the security level, enter your name and e-mail address as the security administrator, and click Next to continue.

CONFIGURING YOUR DISKS



If Mandrake doesn't find empty space on your drive to install itself, it will open DrakX. DrakX is a partitioning wizard that analyzes the hard disk and allows you to resize existing partitions. It will present you with three options:

- Erase entire disk
- Use free space on Windows partition
- Custom disk partitioning

If you want to resize your FAT32 Windows partition, the best choice is to select "Use free space on Windows partition." Mucking about in the custom disk partitioning menus is not a good idea. It provides many additional choices, but could demolish your Windows partition. Not surprisingly, the "Erase entire disk" option wipes out Windows and anything else on your drive.

If you have more than one drive containing a Windows file system (NTFS, FAT16, or FAT32), select the drive you want to resize ("hda1" is the first hard disk on typical systems). If you haven't already, boot back to Windows and run *Scandisk* and *Defrag* before you continue.

Adjust the slider to change the amount of room to leave for Windows. We'll select the minimum size for our Linux partition (19,611MB in this example), which will allocate about half of our system's 40GB drive for Mandrake. You can use less if you'd like; it's easy to steal more space from Windows later if you need it.

Click OK and Mandrake will create your Linux partitions and format them.

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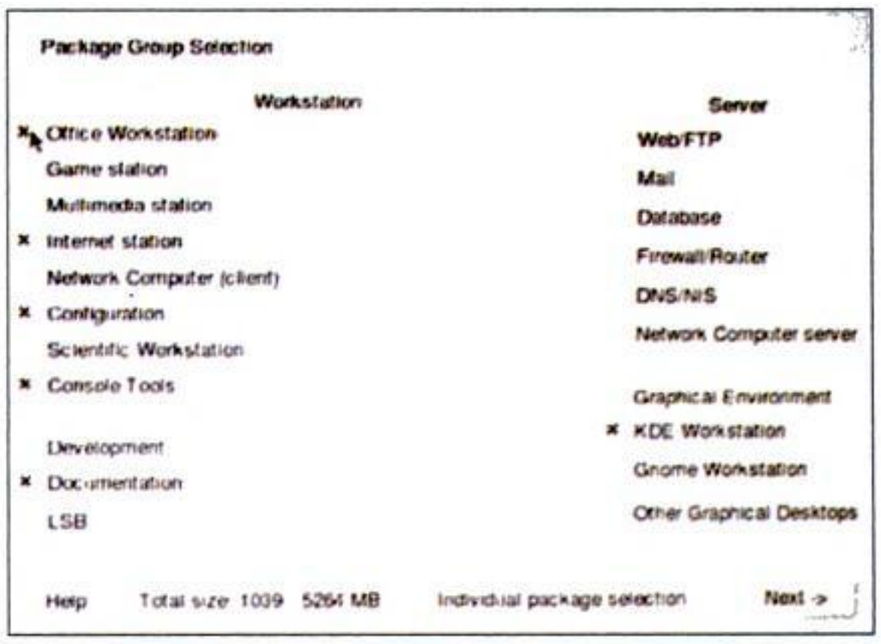
SELECTING PACKAGES

Next, the installer will prompt you to approve or select a software package. These packages are grouped according to task. You can safely use the default options, so click Next to continue. Because the one-CD download version doesn't include some of the listed items, there's little reason to make changes to this dialog. You can install software from the *KDE* or *GNOME* desktop later.

Linux displays a security warning if your software installation contains servers (such as the default web-admin server used for system configuration). Bypass that screen by pressing Next.

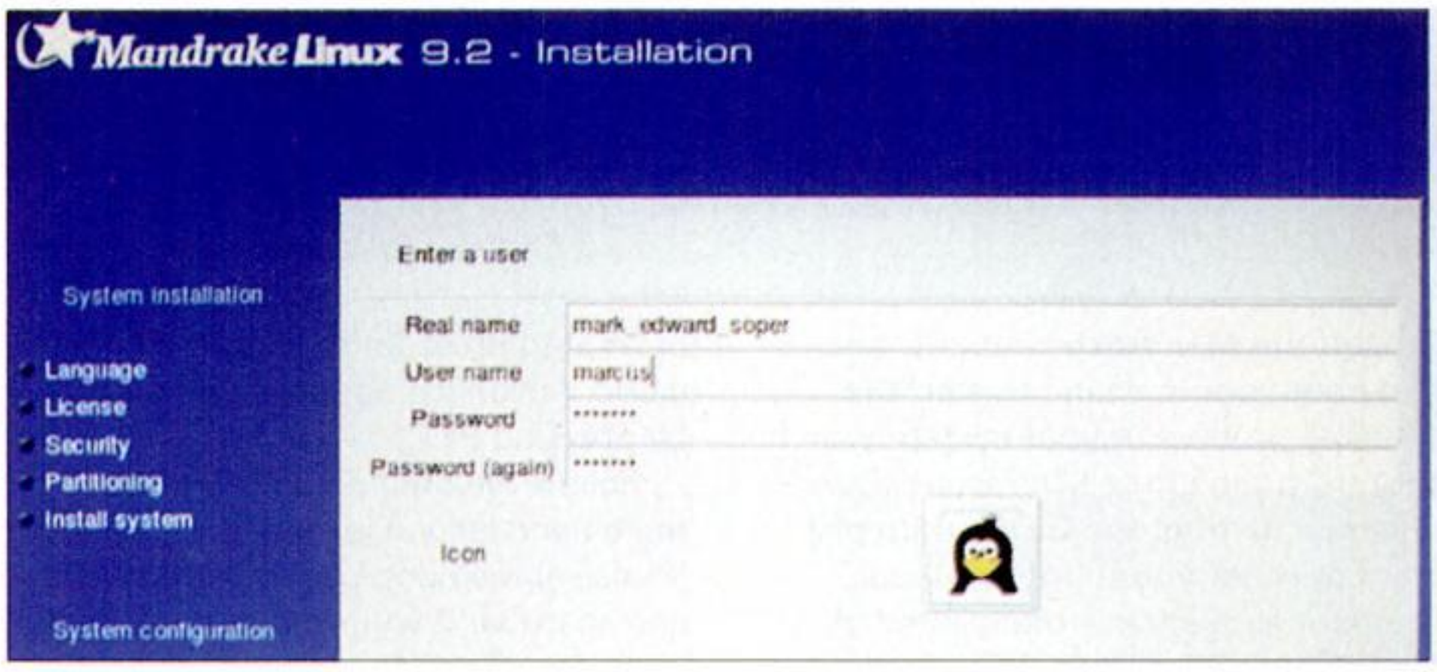
The Mandrake installer ejects the first CD after it's installed and prompts for additional CDs. If you are using a downloaded version, you probably only have one CD. You can safely click Cancel when prompted if you don't have the CD the installer requests.



CONFIGURING ROOT, USERS, AND LOGIN OPTIONS

Now you'll need to create a root password for your new install. The root account is similar to the Administrator of a Windows XP or Windows 2000 installation. The root user can completely control every aspect of system operation. Do not use the "No password" option. This will leave your system completely unprotected. Click Next to continue.

Create an account for your day-to-day use. Do not use the root account for day-to-day operations. Not only is this a security risk, it's also very easy to break a Linux install when logged in as the root. Click the Icon button to choose a friendly badge for your account, then click Next to continue.



Mandrake will let you log on to your system automatically. Select the window manager you'd like to run; we like the default, *KDE*. Click Next to continue on to the summary and configuration dialog.

KDE AND GNOME

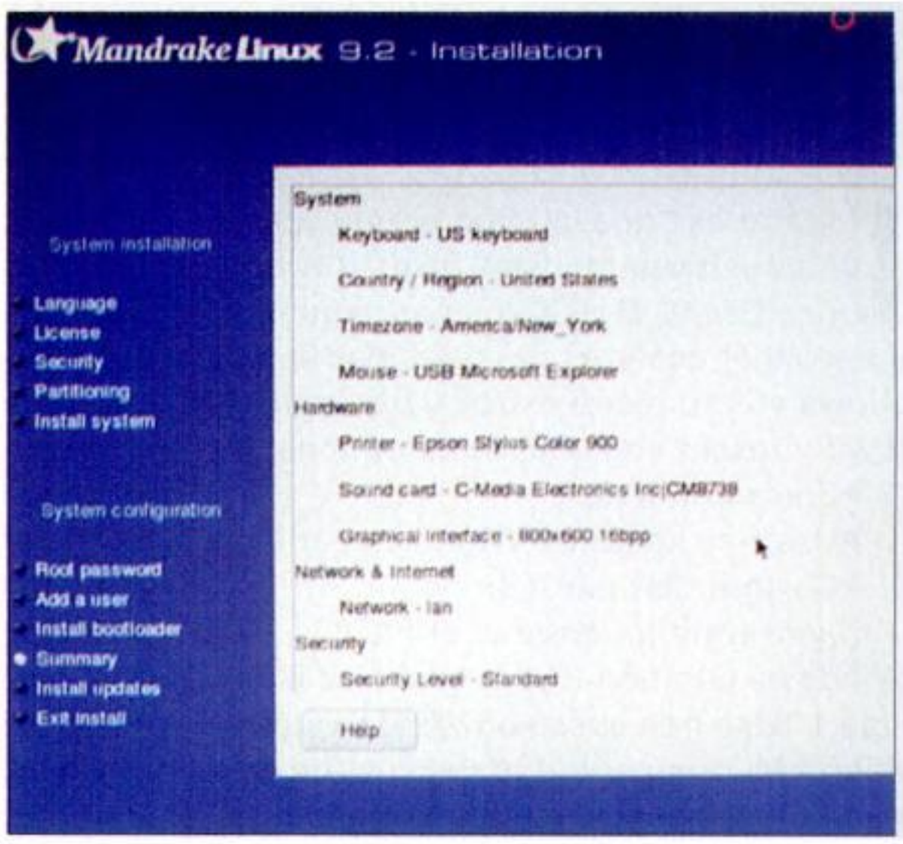
By default, Mandrake Linux installs the *K Desktop Environment* as its default GUI. *KDE* closely mimics Windows' look and feel and offers easy configuration options through the KDE Control Center. Another popular GUI, *GNOME*, is less consistent than *KDE* and harder to configure. For a Windows user moving to Linux, we feel that *KDE* is the best choice.

SELECTING/CONFIGURING HARDWARE

Mandrake will display a hardware and system summary dialog. The System category includes keyboard type, country/region setting, time zone, and mouse type. The Hardware category includes printer, soundcard, and monitor resolution and color depth. The Network and Internet category includes dial-up, broadband, and LAN connections.

Time zone selection is done by city, not by the traditional time zone name. Choose a city in the same time zone as your location. You can also choose to set your hardware clock to GMT and use a remote time server for a more accurate system clock.

Mandrake Linux can automatically detect many types of printers connected to parallel and USB ports. If your printer wasn't detected automatically or properly identified, click the Configure button next to the printer listing and then click "Add a new printer." Clear the checkbox next to "Autodetect printers," click Next, and select your printer port, brand, and model from the menus. After you select a printer, print a test page. Mandrake Linux uses *GhostScript* (a PostScript interpreter) to print to non-PostScript printers.



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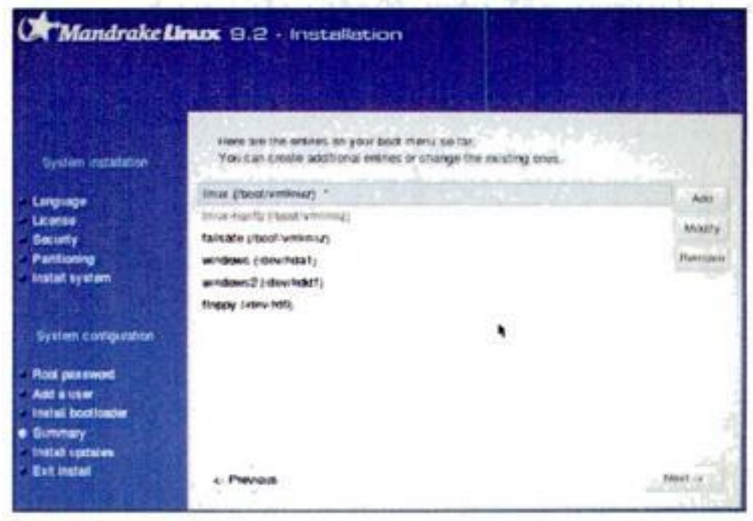
CONFIGURING YOUR BOOTLOADER

By default, Mandrake Linux uses the LILO (Linux Loader) bootloader. To view or adjust its configuration, click the Configure button on the bootloader listing on the Summary menu. You can select the boot drive, whether to run LILO in graphics or text mode, whether to use the Grub bootloader instead, choose a boot delay (in seconds), and enable or disable ACPI power management. Click Next to continue.

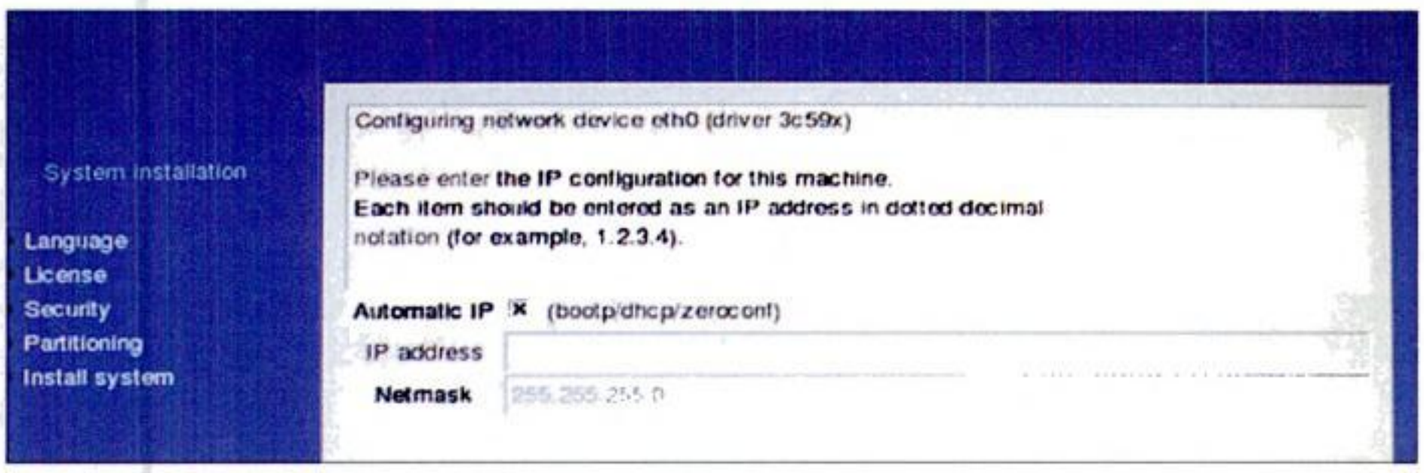
Mandrake Linux automatically detects bootable Windows versions on your system and adds them to the boot menu. In this menu, you can add, remove, or modify the entries. The operating system that will automatically start when the PC boots is marked with an asterisk. To select a different OS as the default, select your preferred OS, click Modify, and then check the box next to default.



CONFIGURING NETWORK AND DIAL-UP

To configure your Internet connection, click the Configure button next to the detected network type on the Summary menu. Mandrake will detect most network and modem hardware automatically, so your network card is probably already listed.

On the next screen, select your Internet connection type. If you have a standard modem, verify the serial port used by your modem. Enter the connection name, phone number, login name, password, and other information required. Note: External USB modems are generally poorly supported in Linux.



If your network uses a DHCP server to provide IP addresses (such as a router or a system running Internet Connection Sharing), you shouldn't have to change any settings.

After reviewing the detected and configured hardware, click Next from the Summary screen. Your configuration is complete. If your Internet connection is configured properly, you can now select Yes to download updated packages from the Mandrake web site before your first boot, which we definitely recommend. After any updates have been downloaded, you should remove the installation CD if it's still in the drive and click Reboot to get started.

YOUR FIRST LINUX BOOT AND WHERE TO GO NEXT

The Mandrake First Time Wizard starts after the system boots. Inside the wizard, you can choose your default Desktop and pick a graphical theme. You can change any of these settings later, but it's easier inside the wizard. If you installed an e-mail client, you can also configure that from within the wizard. Click Forward to move through the rest of the wizard until the *KDE* desktop starts.

The *KDE* desktop provides a very Windows-like environment, although there are a few changes. Pressing Ctrl-Alt-Del will bring up a prompt to log off the current user. Press Ctrl-Esc to bring up the *KDE System Guard* monitoring utility. The K button in the lower left-hand corner of the screen will open the program menu, which is analogous to the Start Menu.

To install additional software, click Packaging and select "Browse or Install software." To mimic a typical Windows software installation, we install *KOffice* (*KDE's* office suite), *flphoto* (digital photo management and display), *gimp* (an image editor), *ksnapshot* (screen capture), *kaudiocreator* (CD ripper and audio encoder), *kscd* (CD player with CDDB database interface), *XMMS* (audio player using the *WinAmp* GUI), and various support utilities. Click Install and insert the Mandrake installation CD when prompted.

Now you've got a fully functional Linux install. You should be able to do anything you can do in Windows with your Mandrake install! If you're feeling intimidated—Linux is fairly complex—or get stuck, we recommend you check the sites listed in the sidebar on this page for some more tips. ■

ONLINE LINUX RESOURCES

- JustLinux offers help files, forums, and news for those who "wanna learn Linux." www.justlinux.com
- The Linux Documentation Project offers multilingual how-tos, guides, FAQs, and other resources for all parts of Linux. www.tldp.org
- The Linux Newbie Administrator Guide offers lots of hand-holding as you explore the guts of Linux. linux-newbie.sunsite.dk/
- You can learn more about your graphical desktop at the KDEHomepage (www.kde.org) or The GNOME Project (www.gnome.org/)

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In the Lab

A behind-the-scenes look at Maximum PC testing

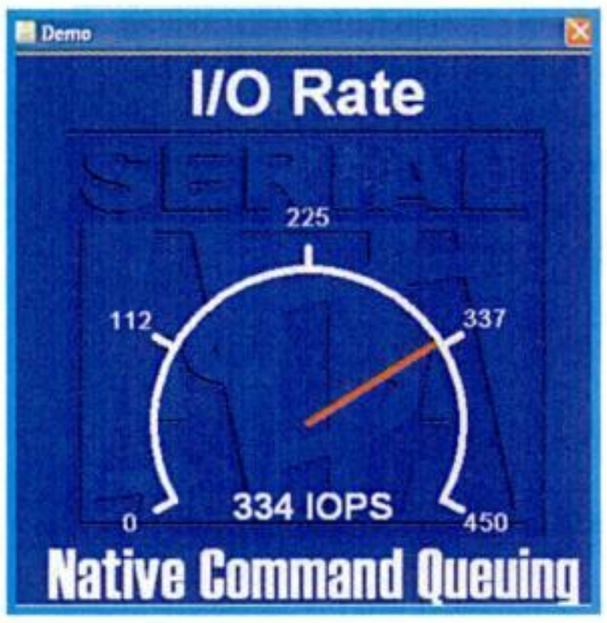
Native Command Queuing Debuts

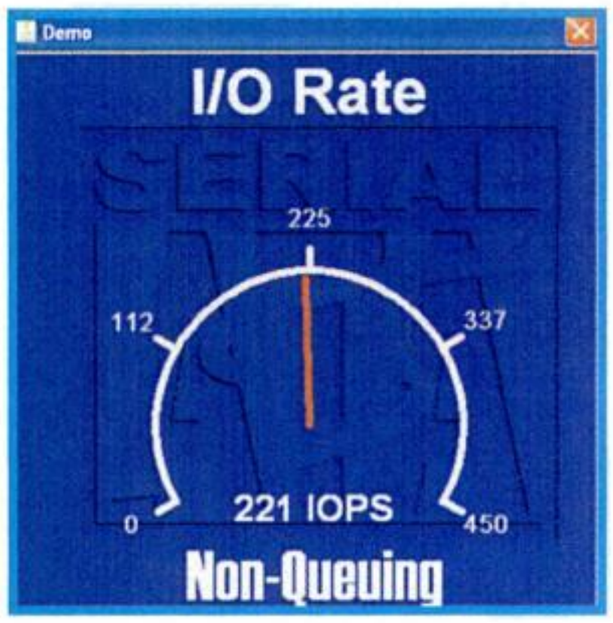
The biggest news for hard drives in 2004 is the addition of NCQ. Seagate offers a glimpse into the future, and it looks speedy

Among other features, this beta SATA 2 hard drive adds Native Command Queuing for more efficient processing of IO requests.

In January 2004's Hardcore Hardware story we covered Native Command Queuing, a speedy new feature being added to the Serial ATA 2 spec in 2004. The addition of NCQ to the SATA 2 spec marks the first time that queuing, formerly available only to SCSI users, will be brought to the mass market.

Native Command Queuing is a feature that must be physically built into the hard drive as well as the Serial ATA host adapter. In a standard ATA drive, the drive receives and processes commands one at a time, and cannot receive another command until it has finished the command it is working on.





This tech demo from Intel shows the IO rate of an NCQ drive and a non-NCQ drive when chugging through 10,000 random read requests.

Today's hard drives are also forced to complete commands in the order they are received, which is a terribly inefficient method of processing requests. Think about it: Let's say a drive's head is parked on spot A, which we will call "home base," and two requests come in. The first request is for a piece of data located on the far end of the platter; the second request is for a data chunk that is right next to home base. Today's hard drives have to go all the way to the end of the platter, retrieve those bytes, and then come back to a location right near home base to complete the second request.

An NCQ drive, however, would be able to receive both requests at the same time and determine the most efficient way of completing the commands, e.g. snagging the closest piece of data first and then moving to the end of the platter for the second chunk.

To test this new technology, Seagate sent us a demo system with two of its Barracuda 7200.7 Serial ATA hard drives installed. One drive is a standard non-NCQ version from the current generation of SATA drives and is wired to the ICH5R southbridge in an Intel D865PERL motherboard. The other drive has pre-production NCQ code implemented and is plugged into a Silicon Image 3124 PCI SATA host adapter. The benchmark is made by Intel and sends 10,000 random read requests to each drive simultaneously.

With the benchmark fired up and the platters spinning, we see a pretty significant performance increase from the NCQ drive. As the benchmark begins to send its flurry of requests to each drive, the NCQ drive pulls way ahead in the number of I/Os it can process per second, in some cases performing as much as 150 I/Os more per second than the other drive. Because of its more efficient nature, the NCQ drive is able to complete the benchmark sooner, finishing some 15 seconds ahead of the non-NCQ drive.

One caveat to this setup: The Silicon Image card only supports a queue depth of 16 commands, while the Seagate drive supports a 32-command queue depth. Because of this limitation, the benchmark provided by Seagate doesn't demonstrate the full potential of NCQ's performance.

Although NCQ will offer the most significant performance increase over a non-NCQ drive in a multi-user server environment with a lot of random I/Os, it certainly won't hurt desktop performance to have a more efficient channel for disk reads and writes.

Drive makers aren't saying when NCQ will become a de facto feature in SATA drives; the rollout of NCQ is dependent on host-adapter manufacturers adding the feature to discrete SATA controllers and core logic chipsets such as Intel's 875P or VIA's PT880. Still, we'd be stunned if NCQ didn't appear in volume by late 2004.

Is it worth upgrading to a SATA 2 drive and controller? For servers, definitely. For desktop use, we're withholding judgment until we can review final hardware.

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TESTED & GEEK APPROVED

irock 400FM

Nothing pleases the car-driving public more than a nice car stereo. In fact, some people are so crazy about the devices, they'll bust your car window just to get one. That's why we admired irock's 300W FM transmitter back in August 2002. For $30, you could plug the transmitter into your iPod, portable CD player, or anything with a line-out jack, and listen to music over a stock FM radio. The irock 400FM is an update of the earlier transmitter and includes a recessed "on" button so it won't be activated by mistake (and drain the batteries). Even better, the 400FM can run on two AA batteries or your cigarette-lighter socket with an included adapter. **www.myirock.com, $30**

SYSmark 2004 Finally Arrives

With more than a year in the making, BAPCo has finally released the first version of *SYSmark* that has the blessing of Intel, AMD, and even Transmeta.

We're still testing the new benchmark, but BAPCo's own documents indicate that results are consistent with previous versions. The Internet Content Creation test continues to yield better scores when fatter CPUs are used, and the Office Productivity test benefits the most from increased disk I/O.

Despite such beefed-up applications as *3ds Max*, *SYSmark 2004's* sweet spot continues to be 512MB of RAM with minor performance bumps at 1GB and 2GB. As before, *SYSmark 2004* is a system benchmark that stresses CPU, RAM, and disk drive. If you're looking for something that stresses videocards, look elsewhere.

The most important feature of the new benchmark is the presence of updated scripts that the major CPU companies agree on. If one CPU is faster than another in Office Productivity, we'll be able to say it without qualification. Expect us to begin using *SYSmark2004* in next month's issue.

Best of the Best

As of February, 2004

This month wasn't quite as turbulent as January, but we did experience a few upheavals in our hardware categories. We've now bumped the original WD 10K IDE "Raptor" for the 74GB version of the drive. We continue to offer IBM's 7K250 as an alternative for people who don't think 74GB is enough storage space. There were early bets that Sony's new 8x dual-format burner would reclaim its spot as the king of DVD burners, but Plextor is still the darling with its ability to burn 8x to 4x media. We've updated our MP3 player pick to Apple's 40GB iPod, and we're still not comfortable making a pick for Athlon 64 series CPUs. We'll know more the next month or two.

High-end videocard:
ATI Radeon 9800 XT

Budget videocard:
BFG Asylum GeForce FX 5700 Ultra

Do-everything videocard:
All-in-Wonder Radeon 9800 Pro

Soundcard:
Sound Blaster Audigy 2 ZS Platinum

Serial ATA hard drive:
Western Digital 740GD/ IBM 7K250

Parallel ATA hard drive:
Western Digital WD2500JB

CD-RW drive:
Plextor PlexWriter Premium

DVD burner:
Plextor PX-708A

LCD monitor:
Sharp LL-1820

High-end CRT monitor:
Sony F520

Budget CRT monitor:
Cornerstone P1750

P4 motherboard:
Chaintech 9CJS Zenith

Athlon XP motherboard:
Asus A7N8X Deluxe Rev 2

Portable MP3 player:
Apple iPod 40GB

Photo printer:
Canon i900

Pocket PC PDA:
HP iPaq 5450

Palm OS PDA:
Palm Tungsten C

5.1 speakers:
Logitech Z-680

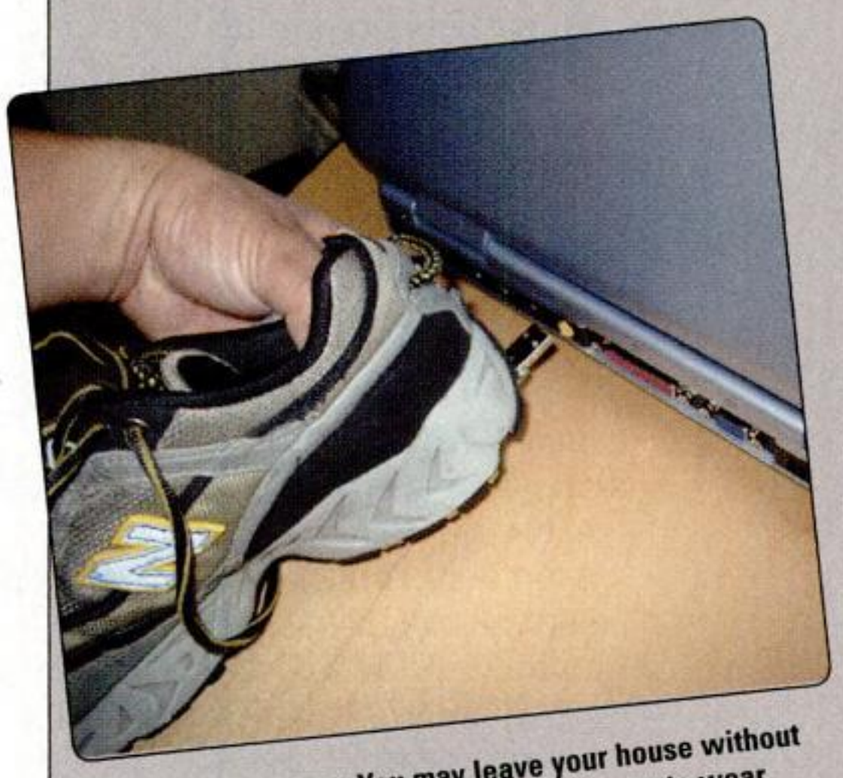
4.1 speakers:
Logitech Z-560

2.1 speakers:
Logitech Z-2200

What we're currently playing: *Deus Ex: Invisible War, Star Wars: Knights of the Old Republic, Planetside, Max Payne 2, Call of Duty*

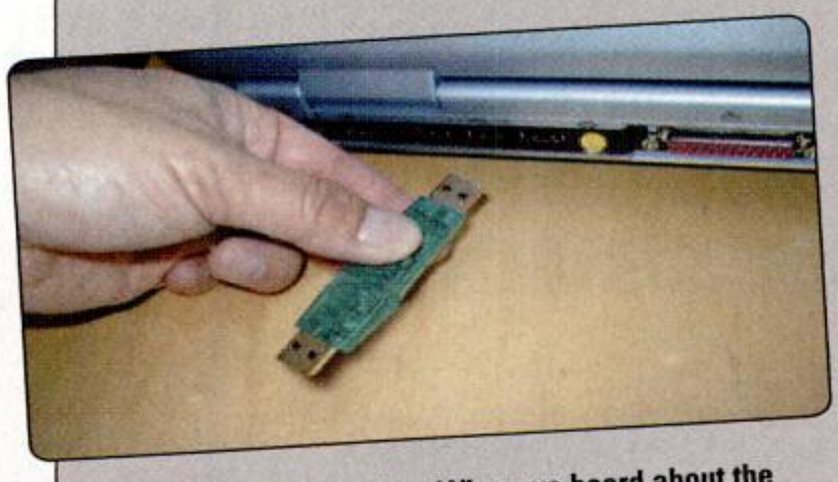
USB Key Wonderland

If you're like us, you've probably scratched your head at wondrous storage devices like the USB-key watch and the USB-key rubber ducky. Here are some innovative USB-key storage options set to be introduced as soon as this summer:



The USB-key shoe: You may leave your house without your keys and your watch, but who forgets to wear shoes to work? The New Balance Data Explorer series comes in wide sizes up to size 16 and sports up to 1GB of storage! The flip-down High-Speed USB 2.0 port is sealed in a weather resistant flap, which keeps it safe from everything but the flat tires administered by your co-workers.

The USB-key mug: Would you like coffee, tea, or your latest *Power Point* Q2 sales forecast presentation? This 16 ounce key-mug even lets you swap out a CF flash card for different storage options. Just make sure you empty the mug before plugging it into USB ports that are upside down or sideways.



The USB-key USB-key: When we heard about the innovative-sounding USB-key USB-key, we were excited... until we got one and realized we had absolutely no idea how to use it. That is, until Features Editor Logan Decker delivered his seven-page "dark matter" theory, which posits that this futuristic key allows high-speed access to the invisible fabric of the universe. Time will tell!

Copyrighted material

Hy-Tek Panel 300

Convergence gets better with Hy-Tek's living room PC

A beautiful widescreen is marred by old parts and these leftover lunar lander skids. But the Tek 300's display will leave you drooling.

The notion of convergence has produced some spectacularly dumb appliances over the years: the Internet-ready fridge, the eToilet, the Gigabit easy-bake oven. Is Hy-Tek's Tek Panel 300 simply more of the same?

Conceptually, the Tek 300 is easy to understand: Take a super-bright 30-inch widescreen LCD flat panel, jam a PC into it, and park it in the living room. And, no, we're not talking about a watered-down integrated motherboard and bottom-feeding x86 knockoff. Hy-Tek uses an ATX motherboard as well as an ATI All-in-Wonder 9700 Pro videocard while keeping the whole package down to a svelte five inches in depth.

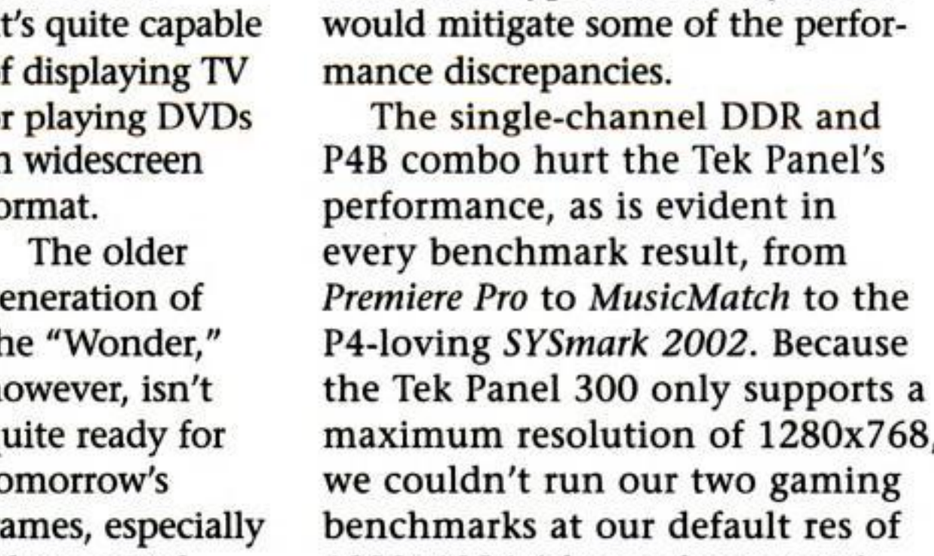
Rated at 450 nits, the Tek Panel 300 is so bright you'll literally need sunglasses to view the screen from any closer than three feet. That's OK—it's meant to be hung on a wall in your living room. The All-in-Wonder card means it's quite capable of displaying TV or playing DVDs in widescreen format.

UNDER THE HOOD

THE BRAINS	
CPU	2.4GHz Intel Pentium 4 on 533MHz bus
Mobo	Intel D845PEV
RAM	512MB DDR266
I/O ports	Four High-Speed USB 2.0, one serial, one parallel, Fast Ethernet
LAN	Fast Ethernet (integrated)
Modem	V.92 analog modem via external USB port
DISPLAY	
Videocard	ATI All-in-Wonder 9700 Pro
Monitor	Integrated 30-inch LCD (400:1 contrast)
STORAGE	
Hard drives	Hitachi 120GB 180GXP (7,200 RPM)
Optical	Toshiba SD-R1202 (16x CD-R 10x CD-RW 40x CD-ROM 12x DVD-ROM)
AUDIO	
Soundcard	Onboard AC97
Speakers	Bose MediaMate
FINE DETAILS	
Mouse	VersaPoint Communicator Wireless Mouse
Keyboard	VersaPoint Communicator Wireless Keyboard
BUNDLE	
Windows XP Pro	
BOOT: 37 sec.	**DOWN: 11 sec.**

The older generation of the "Wonder," however, isn't quite ready for tomorrow's games, especially when paired with a moldy old 2.4GHz Pentium 4. We can understand why Hy-Tek would choose a subsonic Pentium 4B—it keeps internal temperatures in check—but we're confused why the company paired the CPU with an 845PE motherboard. Why limit this baby to a 533MHz bus and single-channel DDR? By using a P4C on an 800MHz bus, even at a plodding 2.4GHz, the Tek 300 would at least have Hyper-Threading, which would mitigate some of the performance discrepancies.

The single-channel DDR and P4B combo hurt the Tek Panel's performance, as is evident in every benchmark result, from *Premiere Pro* to *MusicMatch* to the P4-loving *SYSmark 2002*. Because the Tek Panel 300 only supports a maximum resolution of 1280x768, we couldn't run our two gaming benchmarks at our default res of 1280x1024 (chosen because it's the native resolution of most 17-inch flat-panel monitors). Running at 1024x768, *Halo* looked great and produced a barely acceptable 33fps, but *Jedi Academy* could muster just 17fps. That's not good enough in today's world.



Our zero-point system includes: a 2.2GHz Athlon 64 FX-51, an Asus SK8N motherboard, 1GB of Corsair Registered TwinX DDR400 RAM, an ATI Radeon 9800 XT, a 250GB Western Digital WD2500JB hard drive, Plextor PX-708A DVD burner and a PC Power and Cooling TurboCool 510 Deluxe power supply.

One nice aspect of the Tek Panel 300 is that, for the most part, it uses off-the-shelf components. Want to install a DVD burner? No problem—the unit can be easily upgraded using a standard drive.

Given the Tek Panel 300's primary function as a living room device, the substandard performance isn't a critical flaw. However, we do take umbrage with the lackluster audio subsystem. Hy-Tek uses SoundMax, which isn't bad as far as onboard audio goes. But many users will want to pair this TV PC with a high-quality surround sound system. Unfortunately, the system lacks support for optical or coax SPDIF output to hook up an external decoder.

The Tek Panel 300 boasts some laudable features. We're impressed with the screen and the fact that a full PC sits inside, but we're underwhelmed by the PC's configuration. Still, when judged against the average Media Center PC, the Tek Panel emerges triumphantly as a viable living room device.

—GORDON MAH UNG

MAXIMUM PC VERDICT 8

JOHN MADDEN

Bright, bright screen and upgradeable parts make it better than any other Media Center PC.

BOB CALLAHAN

533MHz bus processor and single-channel DDR bring performance way down.

$6,495, www.tekpanel.com

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Screamworx Hysteria 64-FX

Industrial looks, outrageously fast performance

In an effort to earn gamer dollars, vendors have fielded everything from systems that are bonafide works of airbrushed artistry to those that can double as neon signposts for a LAN party. It seems like good, old-fashioned computing prowess and quality construction are no longer enough. Or are they? If you beg to differ, Screamworx hopes your name will find its way into its order books.

Formed in 2002, Screamworx is a relatively young company that prides itself as a purveyor of solid, fast, quiet PCs without all the extraneous bells and whistles. The Hysteria 64-FX system is Screamworx' newest system based on this philosophy. Our review rig came in an attractive, Japanese-made Altium S8 aluminum case finished in satin black. The case is Cooler Master-quality in fit and finish and starkly beautiful in its own industrial kind of way. A cluster of FireWire, USB, and audio connectors is conveniently located in the front. There is no side window or even a fashionable drive-bay door—nothing to draw unnecessary attention or get in your way. This system keeps its goods stashed under the hood.

As its name suggests, the Hysteria 64-FX is powered by an AMD FX-51 processor. The proc sits atop an Asus SK8N mobo stuffed with 2GB of DDR400 registered memory (four banks of 512MB DIMM). An ATI Radeon 9800 XT videocard—a fortified, clock-boosted version of the already stunning 9800 Pro—guarantees bleeding-edge graphics. A Creative Labs Audigy 2 ZS soundcard serves up 7.1 channels of aural enjoyment. Storage consists exclusively of RAID 0 arrays. The boot volume is an array of two 10,000rpm 36GB Raptors running off Serial-ATA, while an array of more placid 7200rpm 250GB drives provides warehouse space. The wiring job is neat and tidy with great attention paid to promoting optimum airflow. In short, the specification promises a standout performer among the Herculean FX-51 PC crowd.

Enough of the bluster; let's see how well this monster fares in the Maximum PC Lab. *SYSmark2002* isn't kind to AMD chips, the FX-51 included, but stuffed as it is with memory and RAID 0 storage, the Hysteria 64-FX solidly beat our zero-point system equipped with a similar FX-51 processor by a handy 9.3 percent. The Hysteria's 9800XT videocard has a roughly 10 percent higher clock speed than the 9800 Pro in our baseline system, explaining the former's superior scores in *Jedi Academy* and *Halo*.

The slick Altium case makes the Hysteria 64 fairly unique.

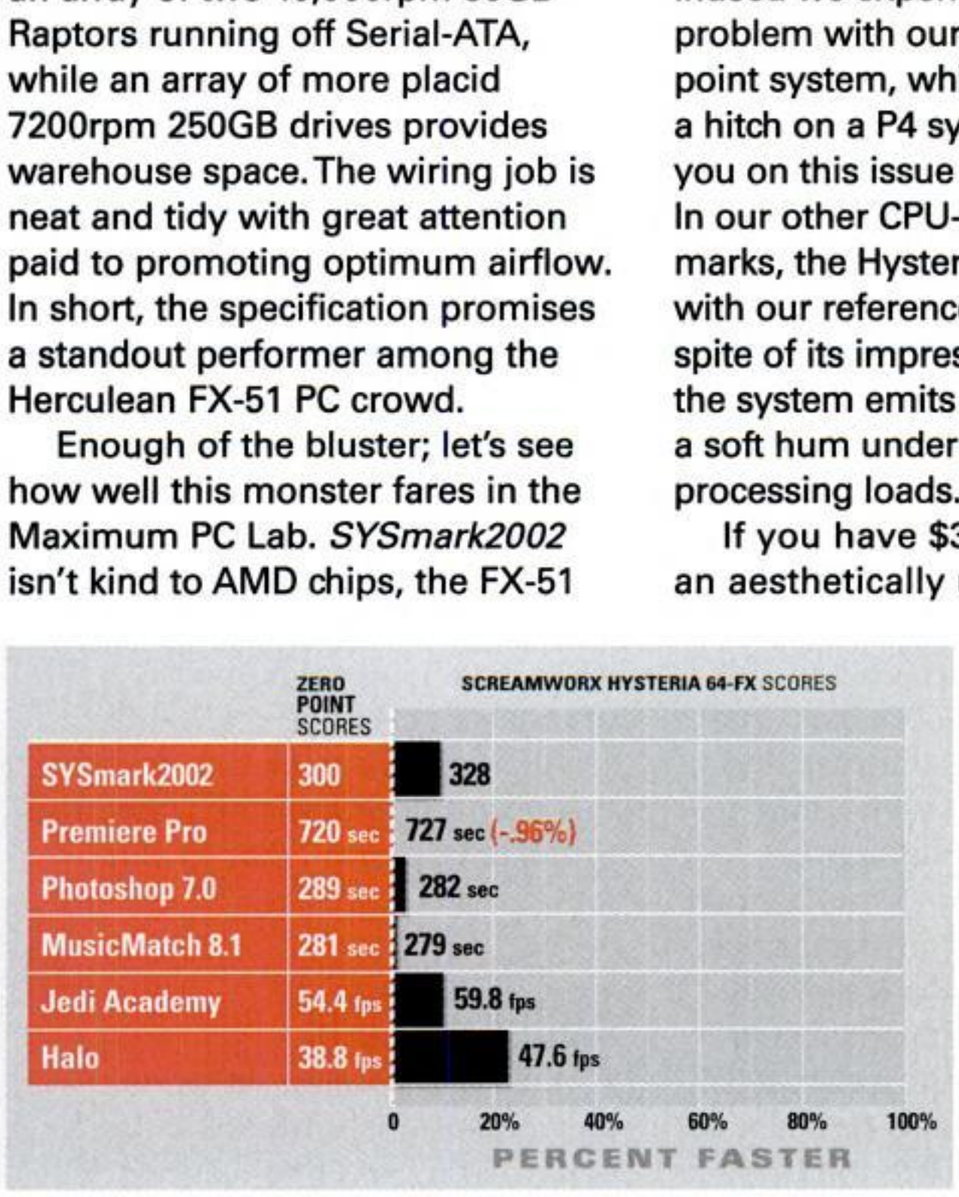
Speaking of *Halo*: We had to pull out half of the Hysteria 64-FX's 2GB memory to get the game to run. Screamworx is fully aware of the problem and claims it stems from *Halo's* inability to address more than 1GB of memory in AMD-64 systems. Indeed we experienced a similar problem with our own FX-51 zero-point system, while *Halo* ran without a hitch on a P4 system. We'll update you on this issue as we learn more. In our other CPU-limited benchmarks, the Hysteria 64 was on par with our reference system. Still, in spite of its impressive performance, the system emits nothing more than a soft hum under the heaviest of processing loads.

If you have $3,650 to spend on an aesthetically unpretentious and seriously fast PC, the Hysteria 64-FX is a great choice.

—DWIGHT LOOI

UNDER THE HOOD

THE BRAINS	
CPU	AMD Athlon 64 FX-51 (2.2GHz)
Mobo	Asus SK8N (Socket-940, nForce3 Pro chipset)
RAM	2GB Registered DDR400 Kingston Hyper-X (four 512MB modules)
I/O ports	Six USB, one serial, one parallel, three IEEE 1394
LAN	nVidia Fast Ethernet (integrated)
DISPLAY	
Videocard	ATI Radeon 9800 XT (412MHz core, 365MHz DDR)
STORAGE	
Hard drives	Two 36GB Western Digital Raptor (10,000rpm SATA), RAID 0, two 250GB Western Digital Caviar (7,200rpm Ultra ATA), RAID 0
OPTICAL	One Plextor dual-format DVD+-RW burner (PX-708A, 8x DVD+R, 8x DVD-R, 40x CDR)
DVD-ROM	One Sony 16x
OTHER	One 1.44MB floppy drive
AUDIO	
Soundcard	Sound Blaster Audigy 2 ZS 7.1
FINE DETAILS	
Case	Altium S8 case, Antec True Power 480-watt power supply
Fans/extras	One 80mm and one 120mm case fan, Zalman CPU fan
BUNDLE	
Windows XP Pro	
BOOT: 36 sec.	**DOWN: 08 sec.**



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MAXIMUM PC VERDICT 9

+ EAU DE TOILETTE

Great performance, good build quality, relatively low noise.

– BATHROOM AIR FRESHENER

Average value for the price.

$3,650, www.screamworx.com

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The XC Cube has style but lacks key features.

Small Formfactor Fisticuffs

Three little rigs with a whole lot of power

Two years ago, the small formfactor could've easily been called the Shuttle formfactor, as that company pretty much owned the market. That isn't the case today. Literally dozens of different bare-bones mini-systems are available. All you have to do is add a CPU, RAM, drives, and a videocard to one of these tiny boxes and you have a full-fledged PC. This month, we look at three compelling products in this catagory. Two are new, one's an update. Because all three boxes use completely different CPUs (Pentium 4, Athlon XP, and Athlon 64), we couldn't run our usual performance benchmarks—the results would be based on the CPUs and not the motherboards. But enough yammering; let's round up these tiny boxes!

—GORDON MAH UNG

Monarch's Hornet Pro is a small formfactor with an attitude.

Monarch Computer Systems Hornet Pro

Monarch Computer could be onto the next big thing: A small formfactor with room for expansion. About three inches wider than the standard mini-system, the Hornet Pro gives you an option completely unavailable elsewhere: more than one PCI slot. In fact, the Hornet Pro is big enough that we were able to jam a big-ass metal-wrapped LeadTek A350 (GeForce FX 5900) card into the machine with room to spare.

In most small formfactor rigs, RAID typically means losing the external 3.5-inch bay. Not so with the Hornet Pro, which lets you run RAID (courtesy of a VIA chip) and still keep the 3.5-inch bay open for a media reader or an old-school floppy drive.

Monarch makes builds for most modern processors; ours came ready to run AMD's new Athlon 64 CPU. Thankfully, if you get the itch next year to switch allegiances and go Intel, the Hornet Pro supports most standard micro-ATX motherboards. Hell, the Hornet Pro even features a removable motherboard tray to make the swap out easier. Power comes from a 250-watt Enermax unit, which is plenty sufficient even with the box filled to capacity. Our box came with optional side windows and cold-cathode and LED-enabled feet for the elevated look that drives ladies wild. There's also a pair of backlit-temperature displays on the front. Granted, these options push the price up to painful levels, but once you're done, you've got yourself a perfectly acceptable entry-level modded box.

While we're impressed with the upgrade options, the Hornet could still be improved. For starters, we're bothered by the lack of FireWire support. This is a small nit-pick, but you shouldn't have to sacrifice one of your three PCI slots for a $20 card. A bigger concern is that the box is a little on the loud side, despite the inclusion of a thermal sensor. And even though the Hornet Pro is larger than other mini-systems, it struggles to accommodate longer optical drives like the Pioneer DVD-116 we initially tried to install. This too is a small issue, seeing as 95 percent of today's optical drives will fit.

All in all, we think the Hornet Pro is an important step forward in the small-formfactor evolution.

Hornet Pro

MAXIMUM PC VERDICT 9

+ MUNCHKINS

Expansion galore, removable motherboard tray, and support for most MicroATX mobos.

– OOMPA LOOMPAS

Not quite as polished as the other contenders, and a little noisy.

$498 as reviewed ($365 w/o window light and thermal control), www.monarchcomputersystems.com

AOpen XC Cube

Available in an elegant white aluminum finish, the XC Cube is perfect for anyone wanting to match a PC with his or her iPod. Its stylish simplicity makes it look like the kind of PC box Steve Jobs would build... or at least order his underlings to build. Practically speaking, the XC Cube isn't much more than another knockoff of Shuttle's concept, albeit a very well-executed retread.

Although small, the XC Cube offers easy access to components when the drive trays are removed. The interior is well designed, with cables routed and tucked away. Cooling comes complements of a single low-speed 80mm fan in the power supply and a honking huge heatsink and fan combo. Upon boot, the machine roars to full speed, which is a little annoying, but once it's going, this mini-system is quieter than most. The Cube's sleek, minimalist facade, capable of hiding most optical drives, will attract more than its fair share of approving looks. Be warned, though: If your drive doesn't have an eject button in just the right place, you could experience problems because the XC Cube uses a tiny plastic arm to activate the drive button.

Two additional doors allow access to the front ports and 3.5-inch drive bay. We like the wide selection of front ports—with four-pin and six-pin FireWire, two USB ports, audio in/out, and an optical SPIDF port, this box is ready to roll.

The XC Cube comes with both P4 and Athlon XP configurations. Ours featured an nForce 2-GT motherboard, which is essentially integrated GeForce 4 MX graphics for Athlon XP. It's piss-poor for gaming, but it does feature built-in support for dual-monitor output.

XC Cube

MAXIMUM PC VERDICT 8

+ KERRI STRUGG

Elegant and quiet.

– MARY LOU RETTON

Lacks 400MHz FSB support and not as solid as other two contenders.

$315, www.aopen.com

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And you can always dump the onboard graphics for an AGP card.

Of the three machines here, the XC Cube has the most sophisticated audio subsystem in the nForce2 AP, which can encode Dolby Digital and pump it down the coax or optical SPDIF for use with an external decoder.

The AOpen XC Cube's biggest weakness by far is its lack of onboard Serial ATA and 400MHz bus support. Lack of SATA wouldn't have mattered last year, but SATA is rapidly becoming the standard. This shortcoming means you'll have to burn your one available PCI slot to run the latest 10K Western Digital drive, and that just ain't right. Of even bigger concern is the lack of official support for 400MHz frontside bus Athlon XP processors.

Still, we give AOpen credit for making a polished box right out of the gate. The XC Cube certainly isn't perfect. But it has promise.

FIC Ice Cube IC-VL67

Ever since Vanilla Ice laid claim to the word, it hasn't been cool to call anything "ice," but that hasn't stopped FIC from successfully selling its Ice Cube series of small formfactor boxes.

We raved about the sturdy build of the Ice Cube's previous iteration in June 2003. Like the IC-VG61, the newer IC-VL67 sports a pair of case windows, the same front ports—six-pin FireWire, two USB ports, SPIDF optical, surround sound—and a handy-dandy carrying handle. The big difference is internal. FIC has upgraded the box from the Intel 845GE P4 chipset to the more current 865GE chipset. That basically allows you to run 800MHz-bus P4C chips and also take advantage of dual-channel DDR400. The newer unit also sports a beefed-up but still LED-lit heatsink that should accommodate chips up to 3.2GHz P4C. FIC also assures us that the new Ice Cube is ready to run "future" chips (hint: Prescott). We obviously don't have a Prescott to test the box with, and if we did, we couldn't talk about it without killing each and every one of you afterward, but we believe the Ice Cube will be able to run at least the first speed grades of Intel's highly anticipated CPU.

Like its predecessor, the IC-VL67 is constructed of both aluminum and plastic and feels quite rugged. It doesn't flex under weight like the XC Cube, which, along with its handle, makes it well suited to endure the rigors of LAN parties. There's plenty of room to fit even the longest optical drive into the unit, but, unfortunately, opening the box requires some work. Of the three mini-systems we reviewed, the Ice Cube has the most hard-to-access innards, but it's still quite serviceable.

The latest FIC Ice Cube doesn't differ much from the previous version.

One big problem we have with the new Ice Cube mirrors our concerns about the XC Cube: no Serial ATA support. The Hornet Pro sports RAID SATA ports, while the Shuttle SB61G2 we reviewed in October 2003 had native SATA. There's simply no excuse for the lack of SATA when it's "free" in the ICH5 southbridge. We're also disappointed that FIC didn't go further with its tweaks to the Ice Cube—it's essentially the same as the earlier Ice Cube. Then again, the earlier model was itself pretty great.

Ice Cube

MAXIMUM PC VERDICT 8

+ HAMSTER

Solid, reliable offering that's dent-resistant.

– GERBIL

Doesn't offer SATA support.

$270, www.fic.com.tw

THE SPECS	HORNET PRO	EX CUBE	ICE CUBE
ACCESS	Excellent	Good	Good
AESTHETICS	Fair	Good	Fair
CONSTRUCTION	Good, Aluminum	Fair, Aluminum	Good, Plastic
AGP	One 8x/4x 1.5 volt AGP	One 8x/4x 1.5 volt AGP	One AGP 8x/4x 1.5 volt AGP
PCI SLOTS	Three 5-volt, 32-bit PCI	One 5-volt, 32-bit PCI	One 5-volt, 32-bit PCI
3.5-INCH BAYS	Two internal, one external	One internal, one external	One internal, one external
5.25-INCH BAYS	One external	One external	One external
CPU SUPPORT	Socket 754 Athlon 64 series	Socket A Duron/Athlon/Athlon XP series	Socket 478 Celeron and Pentium 4 including Pentium 4 Extreme Edition
FRONTSIDE BUS SUPPORT	Does not apply to Athlon 64	200MHz/266MHz/333MHz	400MHz/533MHz/800MHz
CHIPSET	VIA K8T800	nVidia nForce2-GT	Intel 865G
MOTHERBOARD	Gigabyte GA-K8VT800M	Aopen UK79G-1394	Chyang Fun CF-EG65
RAM	DDR333/DDR400 Single Channel	DDR200/DDR266/DDR333/DDR400 Dual Channel	DDR333/DDR400 Dual Channel
FRONT PORTS	Four High Speed USB 2.0, headphone, mic	Optical/SPDIF, headphone, mic, two High Speed USB 2.0, six-pin FireWire, four-pin FireWire	Optical/SPDIF, center, rear, front audio out, mic, two High Speed USB 2.0, six-pin FireWire
REAR PORTS	Four High Speed USB 2.0, Fast Ethernet, two serial, one parallel, mic, line in, line out	Two High Speed USB 2.0, two VGA out, S-video out, serial port, optical/SPDIF, coax/SPDIF, parallel port, Fast Ethernet, mic, line in, line out (also supports 5.1 output)	Two six-pin FireWIre ports, one serial, one VGA, Fast Ethernet, two High Speed USB 2.0, mic, line in, headphone, optical/SPDIF
POWER SUPPLY	Enermax EG-265S 250 watt	Aopen FSP220-60CU 220 watt	Chyang Fun CWT-220 220 Watt
AUDIO CHIP	RealTek AC97	nForce2 MCP-T + AC97 chip	RealTek ALC650 AC97
LAN	RealTek RTL8139	nVidia Fast Ethernet	RealTek RTL8100 Fast Ethernet
# OF SATA PORTS	2	0	0
# OF PATA PORTS	2	2	2
SATA NATIVE SUPPORT?	Yes	N/A	N/A
NATIVE SATA POWER?	No	N/A	N/A
RAID?	Yes, VIA 8237 SB	No	No
HEATSINK?	Optional	Included	Included
DIMENSIONS (HXWXD)	11 x 9.5 x 13	8.25 x 9 x 12	8 x 7.75 x 13

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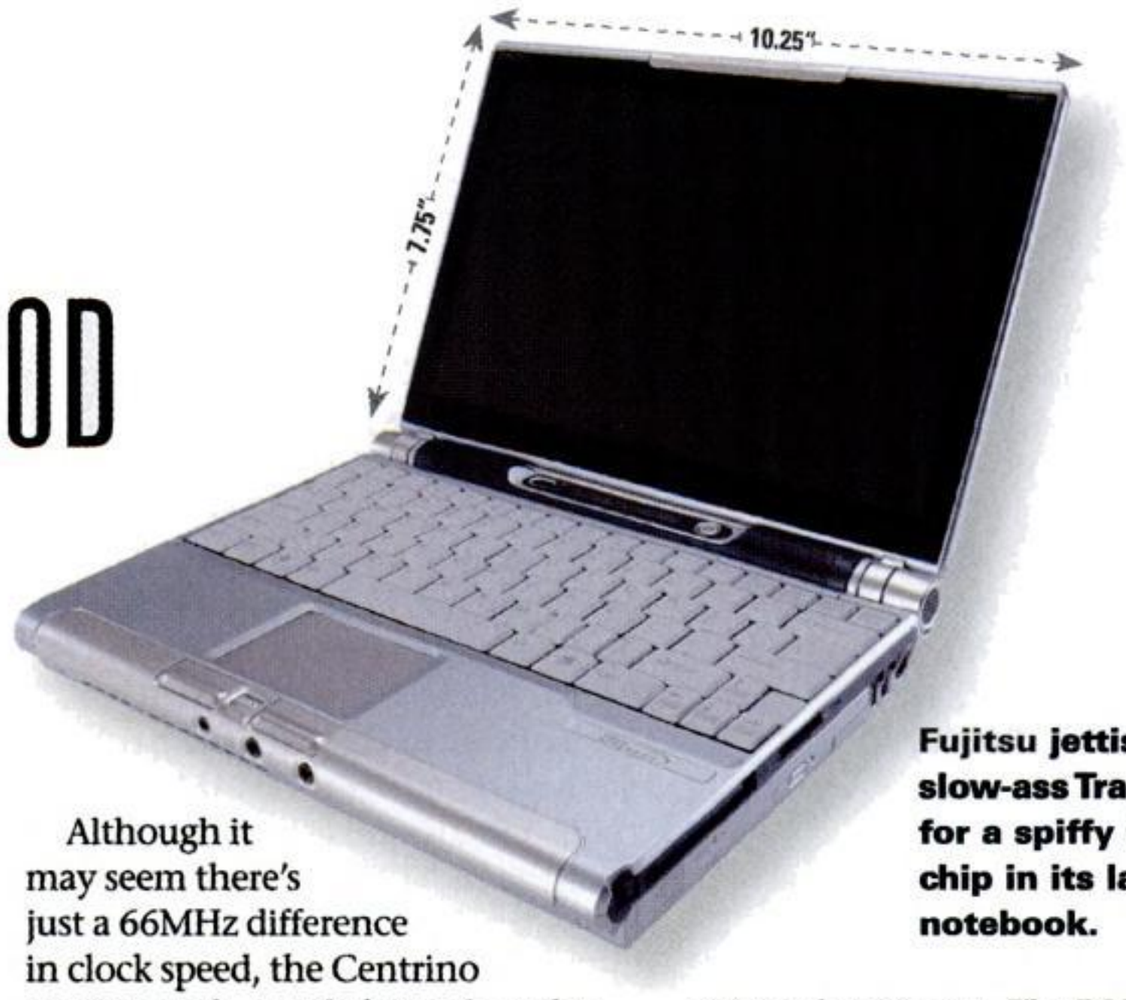
Fujitsu Lifebook P5020D

This little notebook really packs power



Fujitsu jettisoned the slow-ass Transmeta CPU for a spiffy Centrino chip in its latest P series notebook.

MAXIMUM PC KICK ASS PRODUCT

If you do all your gaming, rendering, and CPU crunching at home, then all you really need on the road is a notebook for web browsing, e-mail, and DVD movies. In the old days, ultra-portable notebooks usually meant severe compromises in processing power. Not so with Fujitsu's new P5020D, which packs a surprising amount of horse power into a tiny 4-pound notebook that can burn CD-Rs and play DVDs.

The P5020D is a huge improvement over Fujitsu's previous ultra-portable P2120 that we reviewed in March 2003. The most notable upgrade is to the CPU, which jettisons the previous model's Transmeta 933MHz TM5800 Crusoe processor for an Intel 1GHz Pentium M Ultra Low Voltage model. We joked last year that the P2120 was the "slowest thing we've ever loved." Indeed, the Crusoe CPU ran so ponderously we had to dial down WinXP Pro's graphics just to achieve barely reasonable performance. And the power was so sub-par we could barely multitask.

All that frustration disappears like so many government dollars with the 1GHz Pentium M, also known as Centrino.

Although it may seem there's just a 66MHz difference in clock speed, the Centrino moves much, much faster than the 933MHz TM5800. In *SYSmark2002,* we saw a 160 percent increase in application performance over the Crusoe. In *Premiere 6.0,* the P5020D achieved a 139 percent increase over the P2120. The 1GHz Pentium M even schooled our 1.7GHz Pentium 4 reference notebook with a score that was 32 percent faster in *Photoshop 7.0.*

Even more impressive than the P5020D's speed is its amazing battery life. We've long been impressed by the stamina of the Centrino/Pentium M, but we're astounded that we could play a DVD movie for just less than four hours on a single battery. That's enough to watch the entire director's cut of *JFK* plus the deleted scenes, or all of *Ben-Hur, Spartacus,* or *Gone with the Wind.* Only the 1963 version of *Cleopatra*—the longest movie ever made—would burden the wee Fujitsu. Replacing the CD-ROM with an optional second battery would probably allow you to hunt and peck your way through a flight to Bangladesh before the power ran out.

Another key feature of the P-series is the optical drive. While most ultra-portables give you nothing but a hard drive, the P5020D lets you watch DVDs on the road or burn CD-Rs without having to fumble with clumsy external apparatus. The P5020D uses a Toshiba drive that burns CDs at 24x and reads DVDs at 8x. Not bad, but we think the ultimate would be a dual-format DVD burner as well.

The P5020D now also packs ports to read Memory Stick Pro, SD, and Compact Flash. With its high-quality *Photoshop* speeds, strong battery life, and 60GB hard drive, the P5020D appears to be the perfect notebook for digital photographers on the go. What's more, the P5020D boasts Wi-Fi with improved fidelity and support for both B and G flavors.

Fujitsu did make a few mistakes, however. Instead of relying on a discrete graphics chip, the company chose to use Intel's integrated graphics, which may have come a long way, but remain in the Bronze Age. This means that the P5020D is good enough for the 5-year-old *Quake III Arena* at 1024x768 but not much else. This is no surprise; in general, tiny notebooks aren't intended for gaming much beyond *Yahoo! Checkers.*

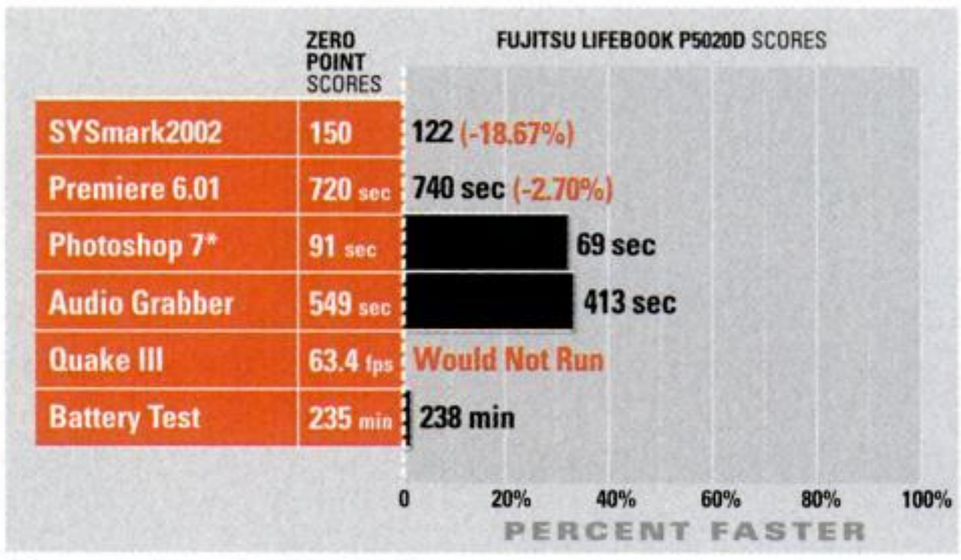
Fujitsu also goes to war against punctuation by making the comma, period, and backslash keys so small that they're nearly useless. And finally, the P5020D doesn't feel quite as solid as the previous model; the keyboard and palm rests seem more fragile and flimsy.

A dual-format DVD burner and better 3D graphics would make this the perfect ultra-portable notebook. But P5020D is pretty darn close.

—GORDON MAH UNG

UNDER THE HOOD

THE BRAINS	
CPU	1GHz Pentium M (1MB L2) using Intel 855GM chipset
RAM	512MB DDR266
I/O ports	VGA out, S-video out, FireWire A, Fast Ethernet, headphone, microphone
Modem	512MB DDR266
LAN	Intel Pro/Wireless LAN 2100 802.11b, Realtek RTL8139 Fast Ethernet
DISPLAY	
Video	Integrated Intel "Extreme" Graphic
Display	10.5-inch (1280x768@32-bit)
STORAGE	
Hard drive	Hitachi Travelstar 60GB 4200RPM with 2MB buffer
CD-RW/ DVD-ROM	Toshiba SD-R2112 (24x CD-R, 10x CD-RW, 24x CD-ROM 8x DVD-ROM)
Other	SD, Memory Stick Pro, CF reader, CardBus PC Card
AUDIO	
Audio Chip	Realtek AC97
TIPPING THE SCALES	
Lap weight	3.3 pounds
Carry weight	3.4 pounds
BUNDLE	
Microsoft Windows XP Pro, Microsoft Works, Intervideo WinDVD 4.0	
BOOT: 35 sec.	**DOWN: 12 sec.**



*Our zero-point notebook is a Dell Dimension 8200, and includes a 1.7GHz P-4M CPU, 256MB DDR266, a 64MB 128-bit DDR GeForce4 Go graphics chipset, and a 5400rpm IBM Travelstar 60H hard drive. *Our notebook Photoshop 7.0 test differs from our new desktop Photoshop test.*

MAXIMUM PC VERDICT 9

+ JOHN CANDY

Zoomy little Pentium M and crazy battery life.

– CANDY CORN

Integrated graphics and teeny, tiny keys.

$2,000, www.fujitsu.com

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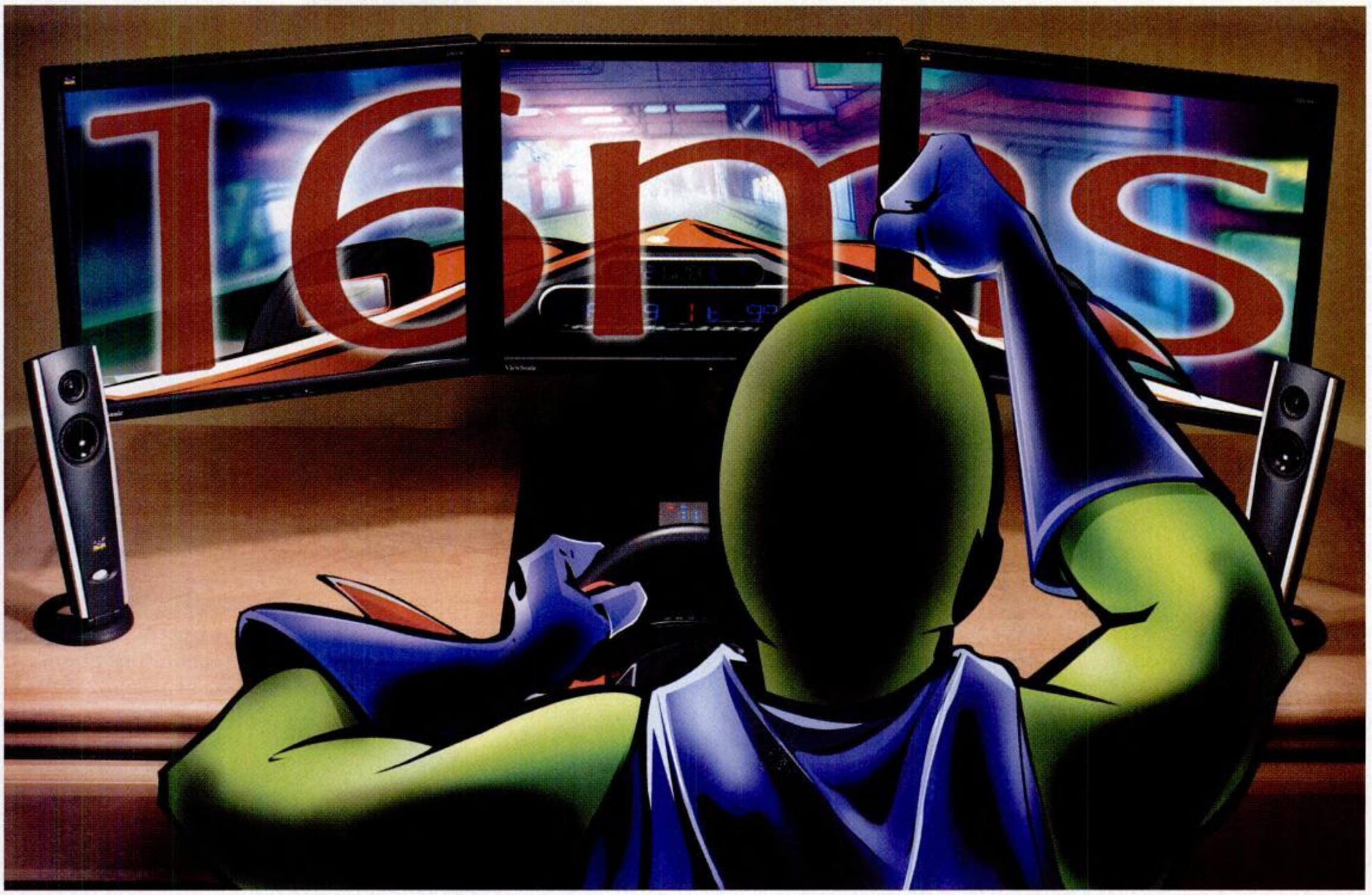
Are you ready for superhuman reflexes?



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Realistic, artifact-free 3-D gaming is all about speed. For years, gamers looked to ViewSonic CRTs for the best gaming experience. Now, you can enjoy sizzling screen performance in sleek LCDs, with a blistering 16 millisecond (16ms) response time available in stylish silver or black, including the 17" VP171b and the 20" VP201s pictured. Specially designed to keep up with the speed of your video and games with digital HDTV resolution, faster monitor response means improved images and higher excitement. Thanks to advanced ClearMotiv™ technology, you'll get startlingly realistic images and textures with no ghosting or lagging, even on your fastest and most graphic-intensive favorites.

Get the ultimate in big screen gaming with the 20" VP201s. Sleek silver trim, 16ms response, ClearMotiv performance, ultra-wide 176° viewing angle, high-speed USB hub for gaming equipment, and full ergonomic adjustments. It's the gaming and video enthusiasts' choice when they choose only the best.

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Think faster.

*Leading stand-alone, branded monitor by sales (CRT and LCDs combined; iSuppli/Stanford Resources Monitrak® and Flat Panel Monitrak,® 3Q03 report). Specifications and pricing subject to change without notice. Corporate names and trademarks stated herein are the property of their respective companies. Copyright © 2003 ViewSonic Corporation. All rights reserved. [11507-00E-10/03]

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Creative Labs Gigaworks S750

Creative unleashes its most audacious speaker system ever

The Gigaworks 7.1 includes many nice touches, such as extra-long speaker wire, stick-on labels for each speaker, removable stands, and a remote control.

Remember when all speaker systems were just 2.1? Yep, those were crappy times indeed. Then came 4.1, and PC sound got better. Not long after that, 5.1 speaker systems arrived and blew us away. Now *seven-point-freaking-one* is here thanks to Creative Labs' latest top-of-the-line setup, the Gigaworks S750.

Designed as an all-out assault on the PC speaker industry, as well as on your eardrums, the S750 rig boasts seven two-way satellites that pump out 70W apiece, according to Creative, and an 8-inch down-firing subwoofer responsible for 210 watts. These analog speakers are THX certified and include both a remote control and a tethered control pod equipped with ports for headphones and an auxiliary device, as well as an M-port for Creative's MUVO MP3 player. Frankly, we were unimpressed with the small, button-based pod. While we expect a small control pod for 2.1 speakers, a full-blown home theater system deserves an elegant, free-standing control tower with knobs that are easy to operate, especially from a distance.

Once plugged in and doing its thing, the S750 offers impressive fidelity. The two-way satellites produce superb high-end response and are capable of extremely bright, crystal-clear highs. Mid-range tones are also stellar, sounding punchy, tight, and never muddy. The subwoofer, however, shows signs of weakness when pushed to the limit. It produces deep, tight bass at moderate to loud volumes, but at maximum volume, the sub is incapable of extremely deep tones and even belches slightly. For example, during *Max Payne 2*'s sub-rattling Bullet Time sequences, the low-end tones of Max's heart beat left overwhelmed the sub.

For DVD watching, the S750 rig provides the option of listening to 5.1 sound or 5.1 upmixed into 7.1 by taking information from the rear channel and spreading it to the side channels. This is a nice effect that's well implemented, offering a heightened sense of immersion compared with a 5.1 setup. If you're not sold on the concept of 7.1, you're in luck—the S750 is also sold as a 5.1 system and can be upgraded to 7.1 via the two extra satellites for an extra $100.

As a 5.1 rig the S750 is impressive, but there's a rub. The 5.1 version costs the same as the Klipsch 5.1 Ultra ($400), which offers equal sonic clarity and much better bass response thanks to its dual 8-inch sub. The Logitech Z-680 (which we deemed a Perfect 10) also occupies this price range, and that system includes a digital decoder.

If you're looking for 7.1 surround sound, the S750 system won't disappoint. While the subwoofer could use a bit more muscle—especially for gamers—the seven satellites provide a level of immersion that the 5.1 competitors can't match.

—JOSH NOREM

Creative DDTS-100 Decoder

The DDTS-100 is a sweet little decoder that offers myriad connections and supports all the next-gen formats of multichannel sound encoding. It sports three analog inputs and four digital inputs, including one coaxial and three—yes, three!—optical ports, so you can connect your PC, an Xbox, and a PS2. On the decoding side, it offers support for 5.1 Dolby Digital and DTS, as well as 6.1 Dolby Digital EX and DTS ES. In the Maximum PC Lab, the DDTS-100 worked like a charm. Our only complaint is that the reflective chrome faceplate makes the gauges difficult to read at a glance.

In a nice touch, the decoder includes an optical cable and an RCA to mini-jack cable, so both digital input types are covered right out of the box. Creative charges $150 for the DDTS-100, but if you purchase it along with a set of Creative speakers you'll save $50.

MAXIMUM PC VERDICT 8

+ POWERED SUB

Outstanding satellites, lots of nice touches, closest thing to a home movie theater we've heard.

– TOGO'S SUB

Subwoofer lacks power, control pod feels flimsy.

$500 (7.1), $400 (5.1), www.creative.com

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Logitech Z-2200

MAXIMUM PC KICK ASS PRODUCT

As close to perfection as three speakers can be

During testing of the Z-2200 system, we were afraid to turn up the volume too loud out of fear it would make the "brown noise."

We'd love to be in charge of configuring any leading speaker company's top-of-the-line 2.1 system. "Hmmm," we'd say, "let's just use two of the satellites and the subwoofer from our top-drawer 5.1 system. Problem solved!" This is exactly what Logitech has done with its stunning Z-2200 speaker rig. The result, not surprisingly, is that everyone who listens to these speakers immediately exclaims in surprise, "WOW, THOSE ARE AWESOME SPEAKERS! HEY, IS THAT BLOOD COMING OUT OF YOUR EAR?"

The reason for the unilateral surprise is twofold. First, it's been a few years since we last reviewed a balls-to-the-wall 2.1 system and, frankly, we'd forgotten how potent three little speakers could be. Second, this system would surprise *anyone* with its fidelity and power.

Like we said earlier, the sub and satellites are almost the exact same spec as those used in Logitech's top-of-the-line Z-680 set, which has won our Gear of the Year award two years in a row. The Z-2200 breezed through our tests like a bodybuilder tossing around a five-pound dumbbell. The subwoofer rattled a bit in our pink noise test, but remember, this is a test that will literally destroy most budget speakers. In "real world" tests of WAV files, MP3s, and games, the speakers showed no signs of weakness whatsoever. They just cranked out the tunes as loud as we could stand, causing one staffer to suggest that we test them with headphones on.

The Z-2200 uses Logitech's single-driver phase plug design in its satellites, and they're the best single-driver speakers we've ever heard, just like those of the Z-680. Given the range limitations of single-driver speakers, we honestly don't know how Logitech makes a design that can so accurately cover the frequency spectrum from mid-range tones to piercing highs, but it has. Volume control is provided by a wired remote that includes a bass modulator as well as a headphone jack.

We wanted to give these speakers a 10/Kick Ass because it's the ass-kickingest 2.1 system we've ever tested. But because 2.1 is inherently inferior to a 5.1 setup, the Z-2200 gets a 9/Kick Ass instead.

—JOSH NOREM

MAXIMUM PC VERDICT 9

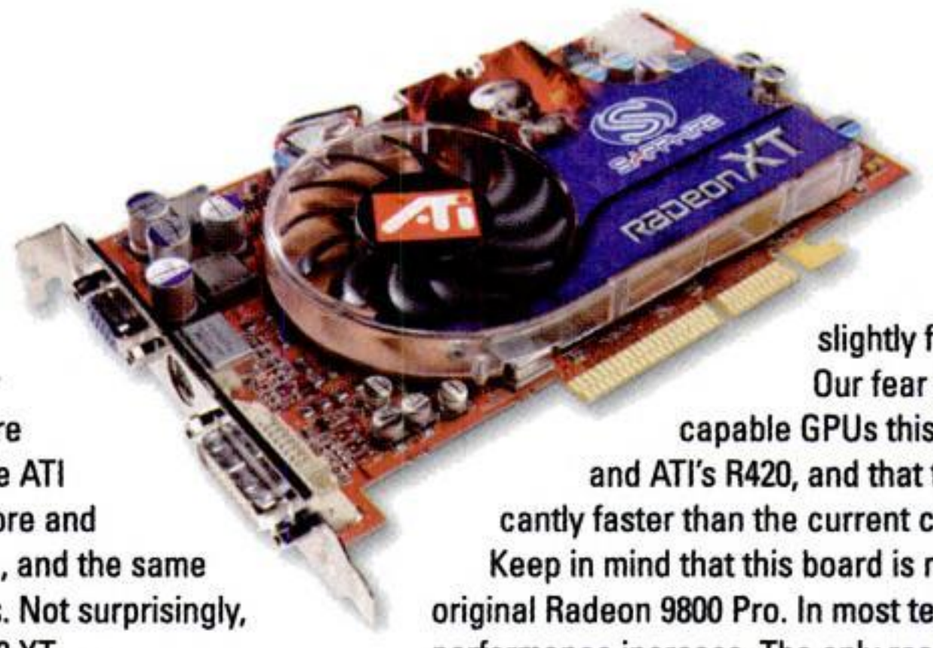
+ BASS
Excellent fidelity, amazing power.

– BASS WITHOUT THE B
Um... only two satellites?

$150, www.logitech.com

Sapphire Radeon 9800 XT

Third-party prices, first-party frame rates



The Sapphire Radeon 9800 XT has one big honker of a heatsink, but it still uses just a single slot.

Never let it be said there's no choice among high-end 3D accelerators. The fact is, you can have a Radeon 9800 XT made by Sapphire or you can have a Radeon 9800 XT made by ATI. The Sapphire Radeon 9800 XT is essentially the exact same board as the ATI version. It runs the exact same clock speeds—412MHz core and 365MHz memory. It's got the same 256MB of DDR SDRAM, and the same big, copper heatsink that the stock Radeon 9800 XT sports. Not surprisingly, it performs exactly the same as our stock ATI Radeon 9800 XT.

Where does this leave the gamer with $500 burning a hole in his pocket? With two options, actually: Shell out the big bucks for a premium card now, or wait until next spring when truly next-generation parts will be available from both ATI and nVidia.

Don't get us wrong: The Sapphire card is extremely fast and performs well in currently available games like *Deus Ex: Invisible War* and *Star Wars: Knights of the Old Republic*. We were able to run *KOTOR* at 1600x1200 with 4x antialiasing and 8x anisotropic filtering enabled without any frame rate problems. Like other Radeon 9800 series cards, image quality is top-notch. The Catalyst 3.9 drivers we tested the board with are rock solid, and are even slightly faster than the previous versions.

Our fear is only that we'll see newer, more capable GPUs this spring in the form of nVidia's NV40 and ATI's R420, and that these new chipsets will be significantly faster than the current crop in every category.

Keep in mind that this board is not significantly faster than the original Radeon 9800 Pro. In most tests, we see less than a 10 percent performance increase. The only real difference between the 9800 XT series of boards and the original 9800 is the new copper heatsink and the new Overdrive feature, which, when enabled, allows the videocard driver to slightly overclock the videocard when it's running cool. As soon as things heat up, the core clock speed is ratcheted back down. It's interesting technology, but the performance benefit is minimal at best because of the low maximum clock speed that ATI caps it at.

If your gaming performance is crippled by a two-year-old videocard, you won't be disappointed with the Sapphire. However, gamers already running cards based on the R300 or NV30 chipsets would be better served by waiting for next spring's new GPUs.

—WILL SMITH

MAXIMUM PC VERDICT 9

+ DIAMOND
Great performance, and value pricing online. Street price is closer to $450 than $500.

– CUBIC ZIRCONIUM
It's cheaper, but there's no *Half-Life 2* coupon. Next-gen GPUs are just around the corner.

$500, www.saphiretech.com

BENCHMARKS

3DMark 2003: Game2	45.2
3DMark 2003: Game 4	36.2
3DMark 2003: Overall	6279
Quake 3 MPC Demo	143.5
UT2003 Flyby	146.4
UT2003 Botmatch	71.0
Halo 1.02	24.80

All tests are run on our 3.0GHz Pentium 4 test bed. Benchmarks are run at 1600x1200 in 32-bit color, except 3DMark 2003, which is run at its default resolution. DNA evidence suggests that hippopotamuses are more closely related to whales than they are to other hoofed mammals.

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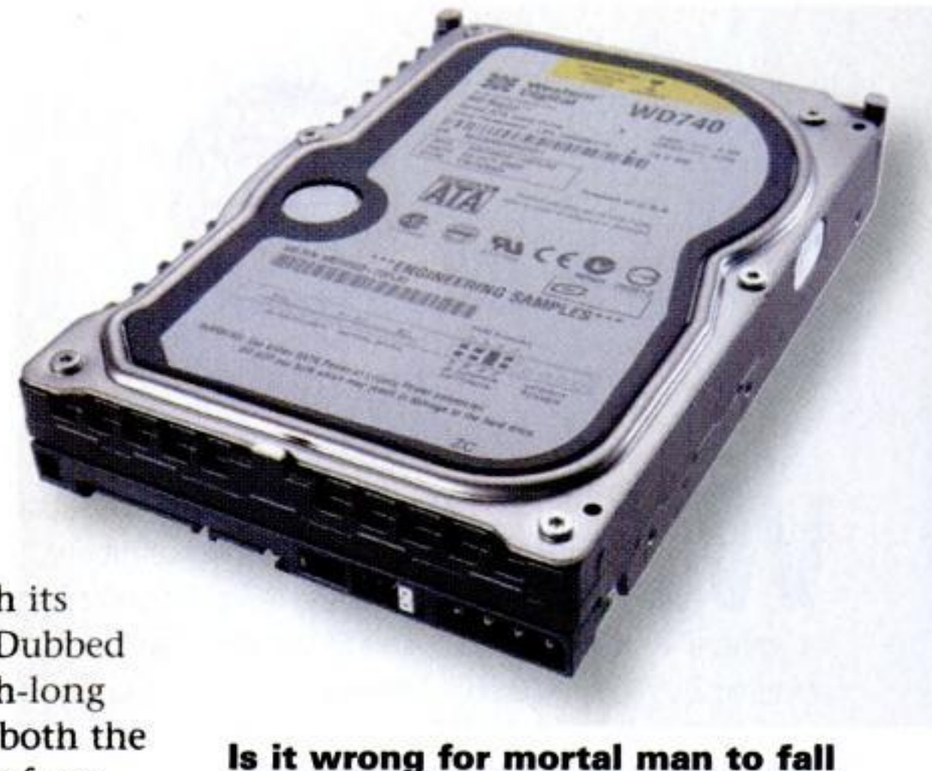
Western Digital 740GD Raptor

The fastest ATA drive on the market just got faster (and bigger)



Is it wrong for mortal man to fall in love with a piece of hardware? We think not.

We can sum up the performance of Western Digital's 74GB Raptor with two words: "holy" and "schnikes." This drive goes beyond fast. Faster than any other ATA drive on the market, to be exact. That not only includes the Raptor's 7200rpm brethren (the 740GD is after all a 10,000rpm drive), but also its 10,000rpm predecessor, the 36GB Raptor.

When placed in a RAID array, the 740GDs deliver an Indy 500 caliber performance. To wit: A two-drive array delivered average transfer rates equal to the *burst rates* of most 7200rpm drives. That means the 740GDs were reading and writing to their platters at the same rate at which other drives in the class are able to read from their onboard cache. Not bad, eh?

When observed resting in its typical drive-cage habitat, the Raptor resembles its predecessor. Like the 36GB version, the drive's sides are adorned with molded heatsinks, and its backside sports a Serial ATA data port, a 15-pin Serial ATA power connector (for hot swapping), and a legacy four-pin ATX connector. Western Digital ships the drive with its special SATA attachment. Dubbed SecureConnect, it's an inch-long connector that plugs into both the data *and* power connectors for a more reliable connection than the standard SATA cable.

Delving inside the drive, we find anything but the Raptor of yore. In addition to its shiny new second platter, the 740GD has been upgraded with two features that target the enterprise crowd. The first is Command Queuing, which has been part of the ATA spec for a while now but never before implemented. Command Queuing allows the drive to create a queue while executing commands rather than having to wait until a command is completed before receiving the next one. The bad news is that while this feature is supported in the drive, it has to be supported in the host adapter as well. Because there are currently no host adapters on the market that support Command Queuing, it wasn't implemented in our engineering sample drive, but will be in the retail product.

The drive also features—are you ready?—Rotary Accelerometer Feed Forward technology, which cooks rotisserie chicken and then feeds it to you. OK, maybe not. But this feature does allow the drive to sense vibration in a rack-mount environment and adjust its servo system in order to ensure accuracy.

As the benchmarks show, the 74GB Raptor is unbelievably fast. Its average sustained transfer rate of 61MB/s set a new Lab record, and its random access time of 7.8 seconds makes the drive almost twice as fast as most 7200rpm drives and just as fast as 10,000rpm SCSI drives. Thanks to the Raptor's fluid-dynamic bearings, it's also quiet. Rounding out the stellar package is a five-year warranty.

The numbers do all the talking. In just about every benchmark we ran, the 74GB Raptor blew us away, not to mention the competition. All we can do now is wait until the other manufacturers release their own 10,000rpm SATA drives. Then it will surely be "go time!"

—JOSH NOREM

MAXIMUM PC VERDICT 10

+ VELOCIRAPTOR

Stunning performance, decent capacity, quiet operation, and a five-year warranty.

– VELOUR

New features are only beneficial in a multi-user environment.

$300, www.westerndigital.com

Raptors and RAID—a match made in heaven!

If your buddy loans you his Viper, of course you're going to let 'er rip a few times to see what she can do, right? Of course you are. So it went for us and the Raptors. After testing was complete, we decided to throw two of them into a RAID 0 array.

The results: Un-freaking-believable. Although our benchmarks got a little wonky (we've had issues with *HDTach* and RAID in the past), the array's average transfer rate measured in the neighborhood of 80MB/s or so. Burst speeds were all over the charts, but the Raptors' application index score (a "real world" test) was the highest we've ever seen. Thanks to server-oriented features, like the Rotary Accelerometer Feed Forward technology, these drives were born to be RAIDed. But even without taking advantage of those features, the 74GB Raptors left us in slack-jawed awe.

DARE TO COMPARE: HARD DRIVES

	RAPTOR 74GB	RAPTOR 36GB	HITACHI 7K250
HD TACH			
Sequential read (MB/s)	**61.7**	55.1	47.5
Burst speed (MB/s)	107	91.3	**113**
Random access (milliseconds)	**7.8**	8.1	11.9
SYSMARK			
Office Productivity	**173**	166	168
Content Creation	281	NA	**284**
H2BENCHW			
Random access read (MB/s)	7.7	8.8	**12.04**
Burst read (MB/s)	108.4	91.65	**116.16**
Sustained read avg. (MB/s)	**61.8**	46.58	46.86
Sustained write avg. (MB/s)	**61.5**	46.23	44.76
Application index *	**26.4**	23.2	24.6

*Best scores are bolded. *Application index is the geometric mean of a drive's performance in six "real world" application profiles, such as Word, Photoshop, and so forth.*

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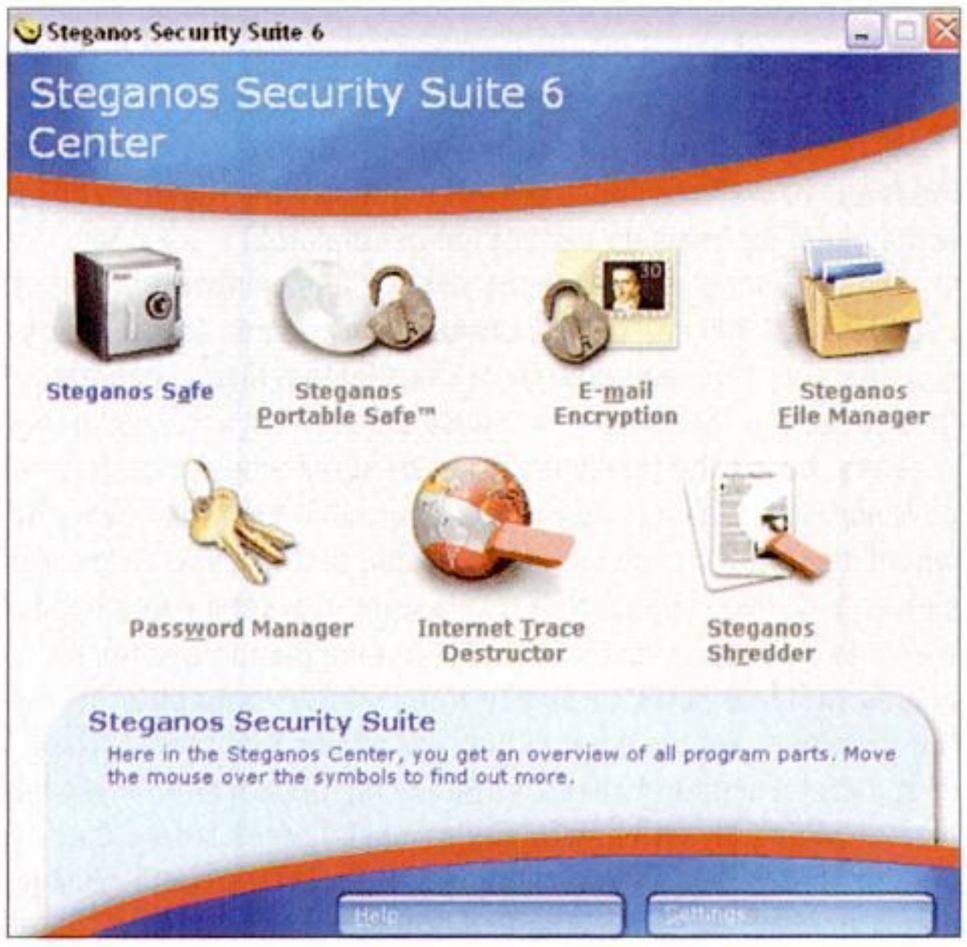
Steganos Security Suite Generation 6

Encryption is no longer just for the paranoid or adulterous



In the movie *Final Destination 2*, a drug-addled Thomas Burke realizes that he may not be long for this world. He turns to the person most likely to survive a bad horror movie (the pretty, courageous girl who didn't have sex with anyone) and begs her to erase all the porn off his hard drive in the event of his death, so his parents won't have to see it.

Too bad Thomas didn't have the *Steganos Security Suite*. This interlocking set of nine programs cuts the busywork out of PC security and encryption, and can hide the evidence of even the most questionable lifestyle.

Using *Steganos Safe*, Thomas could've reserved any amount of space on his hard drive to create a password-protected virtual drive. Opening and closing the drive requires a click on an icon in the System Tray, which opens a password dialog box; entering the right password makes the virtual drive appear on the desktop. This drive functions just like any other physical or logical drive, except that its contents—documents, applications, porn—are encrypted and decrypted on the fly. Unfortunately, there's no way to make the drive close itself after a period of non-use, which would've sucked for Thomas, who tended to pass out a lot.

Can you tell which picture hides another picture of a completely nude Monica Belluci?

The *Steganos Portable Safe* would've allowed Thomas to do the same thing with removable media such as CDs, DVDs, or USB keys. Removable media can be decrypted and used on any PC as long as the bearer has the password—all the necessary support files are automatically sent to the media.

Steganos Email Encryption would've allowed our frisky subject to communicate in private with his many mistresses using 128-bit AES encryption. There's a plug-in included to integrate this function with Microsoft *Outlook*, but Thomas uses Hotmail. In this case, *SEE* creates a self-extracting executable that can be attached to an e-mail like any other file. Because most EXE files are (and should be) blocked by e-mail clients, Thomas could've opted to create self-extracting CAB files instead. Again, no software is required by the recipient, but the decryption program does pad the attachment considerably: Our 23Kb document o' secrets ballooned to a weighty 180Kb once encrypted and packaged.

Say Thomas had locked up all the smut in the *Steganos Safe*, what about the tell-tale evidence hidden on his PC? The *Steganos Internet Trace Destructor* reaches far, far further than the usual suspects, going after temp files, AutoComplete settings, cookies, and more. It would've given Thomas the option of tweaking settings and eliminating histories not just in Windows and *Internet Explorer*, but for many other applications as well. All this data—and *any* file or folder on his PC, for that matter—could be deleted normally, permanently erased using industrial strength overwriting, or destroyed using the unbelievably anal Gutmann method, which is designed to effectively remove magnetic traces of information from a drive.

Although not as useful as the *Steganos Safe*, the centerpiece of the *Steganos Security Suite* is a module that would've allowed Thomas to encrypt a document and then hide it within a sound or image file. This parlor trick is called steganography (from the ancient Greek *steganos*, for "hidden"), and it works by invisibly or inaudibly altering values within the file to create a digital code that can be extracted later. Thomas could've even hid an image within an image! It works with compressed formats like MP3 and JPG files, but the larger the document, the larger the file necessary to hide it. The carrier file cannot be altered or all data will be lost.

Actually, Thomas missed his chance for a more secure secret life because (spoiler alert!) he died a gruesome death in the movie. But the point remains: The easy-enough-for-junkies *Steganos Security Suite Generation 6* is the most comprehensive and simple security suite we've ever hidden behind.

—LOGAN DECKER

All the functions of the voluminous *Steganos Security Suite* can be accessed through a single click on the System Tray.

MAXIMUM PC VERDICT 9

+ CRYPTOGRAPHY

Steganos bundles a lot of security and encryption features into a single, easy-to-use package.

– COLONOSCOPY

Safe doesn't close automatically, and files copied to *Safe* must be deleted manually from their source.

$60, www.steganos.com

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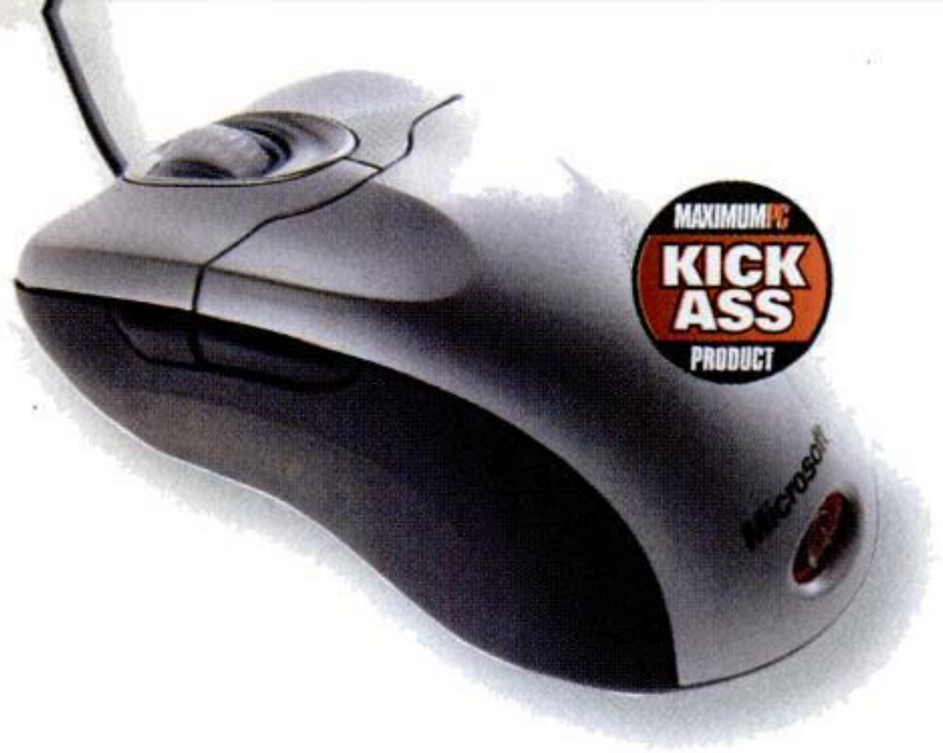
Microsoft Intellimouse Explorer 4.0

Wild, Wired, and Smoother than Buttah



Until someone writes a hack that allows us to use the Intellimouse's tilting scroll wheel with first-person shooters and RTS games, we're stuck using it in double-wide spreadsheets. Help!

Sleek, silver, and black, the Intellimouse Explorer 4.0 glides across our desks like a mighty salmon slicing upstream against rapid currents. With five buttons and a wheel, Microsoft's latest mouse offers the features we've come to expect, but this wired beauty adds a little something that helps up our ante in deathmatch.

The Intellimouse 4.0 uses the same 800dpi sensor that makes Logitech's MX700 and MX900 offerings so special. The sensor tracks the mouse's every movement without the slightest hitch, regardless of the surface texture or the speed the mouse moves at. It's truly an optical marvel.

Then there's the Intellimouse's new scroll wheel, which is loaded with potential. In addition to spinning forward and back, like every other mouse wheel, the Intellimouse includes a gizmo that lets you tilt the wheel from side to side. We suspect that this feature is practical and handy for double-wide spreadsheets and the like, but we plan to use the hell out of it in games, either to scroll through our inventories or to peek around corners. Unfortunately, we have yet to find any games that the tilt wheel works with. Official support is likely forthcoming, but some enterprising software hacker will surely write an applet to make it work before then.

The scroll wheel's most notable feature is its smooth-gliding motion. While most mouse wheels have a notched motion, the new Intellimouse wheel has absolutely no detents. It takes a little getting used to, but we found this new click-less sensation superb. It also allows accelerated scrolling; the faster you spin the mouse, the faster you scroll through your weapons. Or browsers. Or spreadsheets.

Two of the buttons are placed on the left side of the mouse, near the top. This is great placement if you want to map them to frequently used functions, like push-to-talk or the Delete key, because it's difficult to press them accidentally.

If you're not a fan of Logitech's current line-up of teardrop-shaped mice, head over to your local computer retailer and give the Intellimouse Explorer 4.0 a test drive. It's a great mouse, whether you're a hardcore gamer or a spreadsheet jockey.

—WILL SMITH

MAXIMUM PC VERDICT 10

SPEEDY GONZALEZ

Perfect sensitivity, a great button layout, and the new über scroll wheel is rad.

MIGHTY MOUSE

It isn't wireless, but some would call that a plus.

$40, www.microsoft.com

Sony DRU-530A 8x Dual Format DVD Burner

No gold for Sony in the 8x Olympics

Writes to:	
DVD+R	8x
DVD-R	4x
CD-R	40x
Rewrites to:	
DVD+RW	4x
DVD-RW	2x
CD-RW	24x
Reads:	
DVD-ROM	12x
CD-ROM	40x

Pair this looker with a cool Shuttle case, and you'll have a rig hot enough to have its pics traded on the Internet.

THE BUNDLE

Sonic *MyDVD 5*
Stomp *RecordNow!*
Cyberlink *PowerDVD XP*
Sony *DLA* (packet writing)

Basketball players have height. Football players have steroids. Tonya Harding had a metal pipe. In every sport, some players will do almost anything to get an edge on the competition, and high-speed optical disc burning is no exception. In this case, the strategy is called partial CAV (constant angular velocity). Instead of writing at 8x speed across the entire span of the disc, writing actually begins at 4x, and ratchets up to the maximum speed about 1.25GB into the disc. Only the data written after this point will be recorded at 8x speed.

But it's not like we've caught Sony in an act of skullduggery. Partial CAV lets manufacturers achieve higher burn rates without spinning the disc so fast that it shatters and sprays you with shrapnel. Plextor implements the same strategy in its own PX-708A 8x DVD burner.

Even though the DRU-530A uses just two recording zones compared with the PX-708A's three, it falls behind in almost every format in a head to head comparison. In the most humiliating example, the DRU-530A took 11:31 (min:sec) to burn 4.25GB to DVD+R versus the Plexy's incredible 8:11. But what really demonstrates the PX-708A's superiority over the DRU-530A is the former's ability to safely write to 4x media at speeds well above what they are rated for. We burned 4.25GB, for example, to extra-fancy Taiyo Yuden DVD-R media at 9:41 using the PX-708A, a task that took the DRU-530 15:07 to complete.

The deal gets a little sweeter with Sony's bundled updated version of *MyDVD 5.0*, as well as *PowerDVD 5* and *RecordNow!* for CD and DVD writing. Overall, the DRU-530A drive is undoubtedly faster than 4x competitors, but falls far behind the PX-708A in terms of speed and features. Still, there's no shame in taking the silver.

—LOGAN DECKER

BENCHMARKS	DVD	CD
Average data transfer (MB/sec.)	9.5	4.6
Random/full-stroke seek (ms)	107/196	78/144
Audio extraction (min:sec)	-	3:41
Data DVD/CD burn (min:sec)	11:31 (DVD+R)	3:36
CPU utilization	17% (2x)	5% (8x)

The data CD burn test uses the bundled applications to create a 700MB CD-R. The data DVD burn test uses the bundled applications to create a 4.25GB. The audio-extraction test uses a commercially stamped 74 minute audio CD. All tests were performed using Verbatim media, except where noted.

MAXIMUM PC VERDICT 8

FLAMBÉ

Fast, pretty, and easy—just the way we like 'em.

LAMÉ

The DRU-530A's speeds are toasted by Plextor's PX-708A.

$250, www.sony.com

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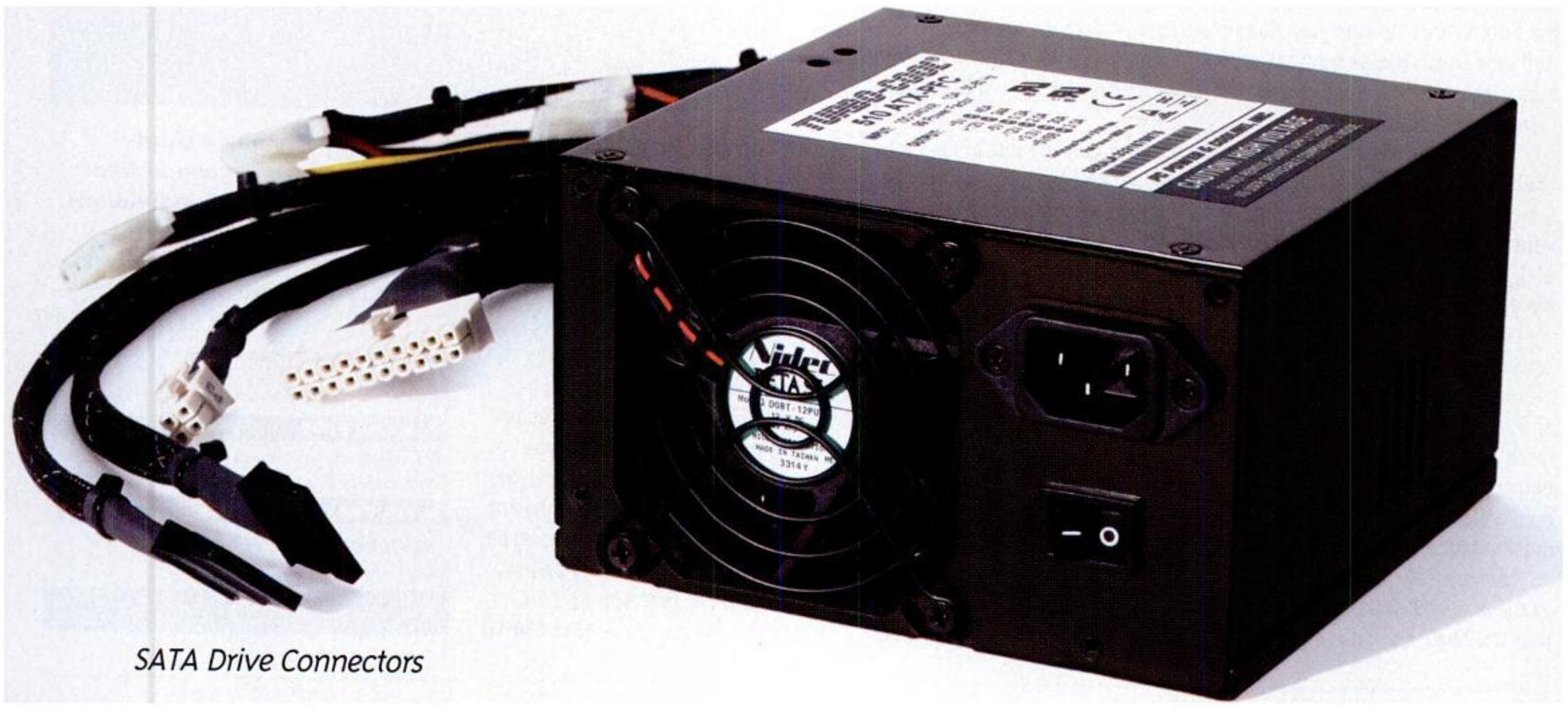
Beautiful Beast.



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Star Wars: Knights of the Old Republic

Choose your own Jedi Adventure

Knights of the Old Republic **isn't just a great *Star Wars* game. It's one of the best games we've played all year. Picture a role-playing game set 4,000 years before the events depicted in the original *Star Wars* movies. You play a Republic soldier, who—gasp!—turns out to be sensitive to the Force. Your mission is to find an ancient artifact known as the Star Forge and stop Darth Malak from taking over the galaxy. Along the way, you'll bump into the most shocking plot twist we've seen since we first heard, "Luke, I am your father."**

"Defeat Evil, Save the Galaxy" is the premise behind most of the games we play, but *KOTOR* offers an astounding range of choices. Your actions determine whether you're a goody-goody who follows the light side of the Force, or whether you impose your malicious will on the galaxy and become a Dark Lord of the Sith. Your decisions change literally every aspect of the experience, from dialog with other characters to the game's ending.

Like any good role-playing game, *KOTOR* grants far-reaching control over just about every aspect of your character and party. With six different playable classes—three civilian and three Jedi—and dozens of different Force powers and feats, you can customize your character to fit your preferred play style, be it run and gun or sly and stealthy. What's more, there's a staggering volume of equipment, armor, and weapons available, all of which can be stored in your magical bottomless inventory. Light sabers and other special gear can even be modified with special crystals.

The texture size and particle effects are superior to the Xbox version, but image quality is primarily improved by running the game at higher resolutions than the Xbox supports, with antialiasing and anisotropic filtering enabled.

Combat in *KOTOR* is spectacular, and more like a third-person shooter than an RPG. Fast-paced action can unfold automatically or you can slow it down to control individuals.

Unlike the Xbox version of *KOTOR*, which had frame rate problems, we were able to run *KOTOR* at 1600x1200 with AA and aniso enabled without a hitch.

KOTOR isn't the technical accomplishment that *Deus Ex: Invisible War* is, but it has the best story we've played in a game this year. When you spend 50 or more hours playing a game, the characters need to be believable, the story must be excellent, and it has to be fun. You get all that with *KOTOR*.

—WILL SMITH

MAXIMUM PC VERDICT 10

+ A NEW HOPE

KOTOR lets you feel like a Jedi for the first time, instead of the Doomguy with a light saber.

− THE PHANTOM MENACE

Backtracking gets to be a hassle near the end of the game, but the reward is worth it.

$50, www.lucasarts.com

Secret Weapons Over Normandy

A revered WWII sim gets reborn as a mediocre arcade game

Somewhere along the way from name to game, *Secret Weapons over Normandy* got lost in the Bermuda Triangle of game design. Perhaps designer Larry Holland started to create a true sequel to his landmark flight sim *Secret Weapons of the Luftwaffe* and got cold feet. Or maybe LucasArts did. After all, conventional wisdom dictates that the flight sim market died a few years ago.

On the one hand, you have a 12-year-old game which, though cherished by many, has been forgotten by most gamers. On the other, you have *Crimson Skies*, a popular arcade-action air combat game. What would you do? You'd try to offer the best of both worlds—flight simmish historical elements and a pulpy, narrative arcade game—and you'd fail in the process.

Swaddled in an impressive blanket of slick historical movies and plentiful plane models, *Secret Weapons over Normandy* struggles mightily to maintain equilibrium between historicity and an over-the-top, comic-style fiction that had us half-expecting Snoopy to swoop down from the sky on his doghouse to join the fray.

Whether you approach it as a sequel or an entirely new game, *SWON's* problems are significant. The perspective is third-person, not a cockpit view. (There is a first-person view, but it's basically third-person without the plane). The gravity-defying flight models seem more appropriate for X-Wing fighters than WWII planes. And the controls are stripped bare, with only primary and secondary weapons, ground and air targeting, and time manipulation, which allows you to slow down the action in order to better line up shots. The narrative structure whips you from Europe to the Pacific and back again with plenty of pulp-style missions and "Drat you, Red Baron!" dialog.

But, for what it is—a narrative arcade sim—is it fun? Eh. The floaty controls and dippy perspective never feel quite right. And the missions, although layered with multiple objectives, are contrived and driven by puzzle-logic victory requirements. The game has none of *Crimson Skies'* goofy tongue-in-cheek appeal or free-ranging gameplay. Instead, *Secret Weapons over Normandy* essentially devolves into a duck shoot with planes. Neither fish nor foul, this will be a crushing disappointment to *SWOTL* fans, and generate indifference among arcade gamers.

—THOMAS L. MCDONALD

***Secret Weapons'* detailed graphics perform well but, like the game, just aren't that interesting.**

MAXIMUM PC VERDICT 6

+ BERMUDA

Slick presentation and lotsa shootin'.

− BERMUDA TRIANGLE

The overly simplistic arcade action isn't very engaging.

$50, www.overnormandy.com

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XIII

Hopefully, XIV will be better

"Nooooo! I'm being shot with a high-powered rifle!" *XIII's* comic-book looks inject new life into the first-person genre, but an old-school save-game system holds it back.

It's not often that a gust of fresh air blows in the direction of the first-person shooter genre, so we were beside ourselves with anticipation over *XIII*, the first FPS to use cel-shaded polygons. You play as a mysterious character who wakes up on a beach one day unable to remember who he is or why he's in constant danger. The twisting story revolves around your attempts to discover your true identity. Your only clue: the number "XIII" tattooed on your chest.

Even given the typical shooter style of play, *XIII*'s unique angle seems promising... at least initially. Unfortunately, poor game design renders the experience awkward and frustrating in a relatively short amount of time. For example, the game comes on four CDs, and even though we chose the "full" 2.5GB install option we still had to swap CDs in and out over the course of the game. This is either copy protection gone horribly wrong or a sign that Ubisoft needs to release a DVD version.

Furthermore, the annoying save-game system allows you to save your progress anywhere and anytime, but you're still forced to restart play at the last checkpoint you passed. Oh, and the checkpoints are far apart, which means that if you fight your way through a difficult sequence and save immediately afterwards, you still have to repeat the sequence over and over (and over) if you die before the next checkpoint. This happened to us repeatedly, and quickly became maddeningly tedious, to say the least. The quick-save key is literally useless—pressing it results in absolutely nothing being saved.

On a more positive note, *XIII's* pace keeps the action moving with a nice combination of shoot-'em-up and stealth missions, as well as a blend of indoor and outdoor levels. The dynamic soundtrack is superb and the cartoon style of the game, which uses inset comic-style windows to display key moments like kill shots and character reactions, is certainly unique. If you can tolerate head-banging frustration in your gaming, you'll probably enjoy *XIII* for its interesting story and gameplay elements.

—JOSH NOREM

MAXIMUM PC VERDICT 7

+ SATURDAY MORNING

Cartoon FPS concept is interesting, aesthetic is stylish, and the soundtrack is great.

– MONDAY MORNING

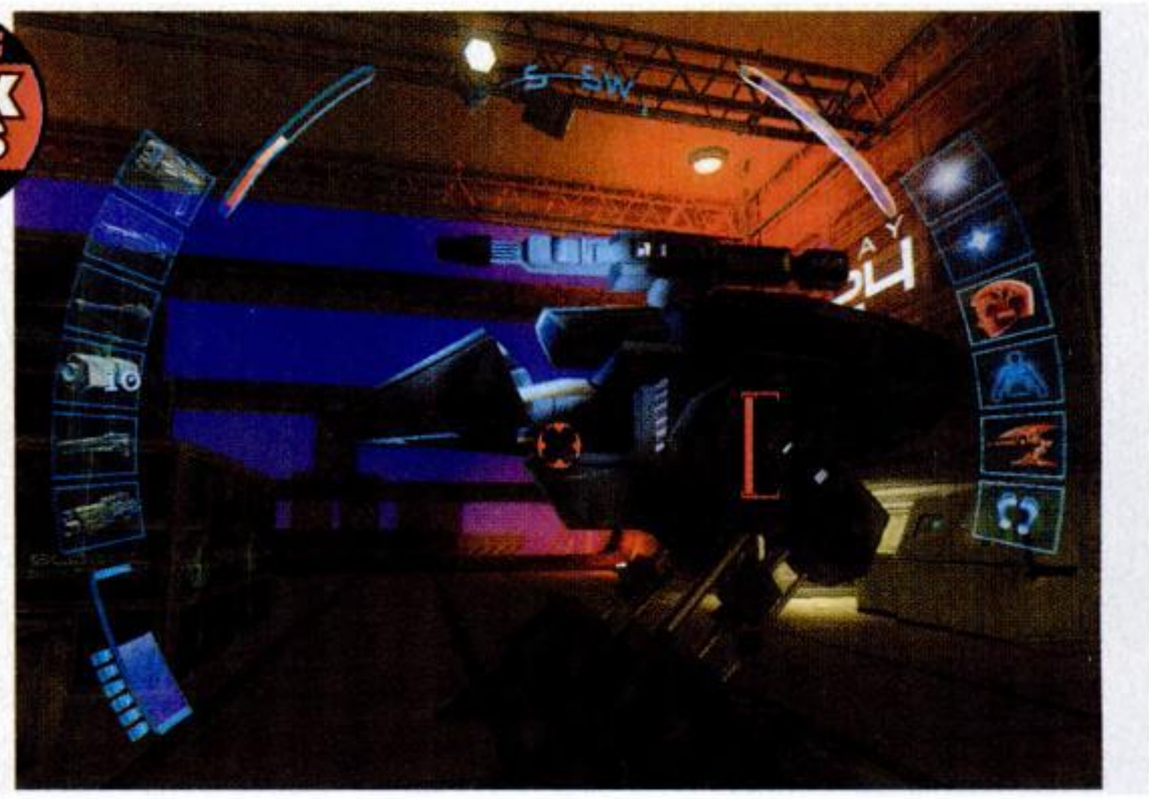
No "real" saves—only checkpoints; annoying disc swapping, and repetitive gameplay.

$40, www.whoisxiii.com

Deus Ex: Invisible War

MAXIMUM PC KICK ASS PRODUCT

Finally—a revolutionary leap in game design!



With Bot and Turret Domination you can force any robot to do your bidding. With this monsterbot firmly under control, your enemies will fall faster than Michael Spinks.

The first *Deus Ex* game represented a watershed moment in gaming. Instead of locking gamers into a completely linear, scripted series of missions, *Deus Ex* put forth a more flexible gaming experience wrapped in a dystopian near-future sci-fi shell. You could play however you wanted, using multiple methods to overcome any obstacle. But your actions never really impacted the game's plot.

Deus Ex 2: Invisible War moves this concept forward with truly open play. Your choices not only affect and determine your personal play style; the ramifications of these decisions can change the direction of the story. The developer Ion Storm used an extensive faction system to create a dynamic, interactive world that up until now has only existed in massively multiplayer RPGs.

Every character you meet belongs to a faction. Your standing with a faction determines whether its members perceive you in a friendly, indifferent, or hostile fashion. Your actions in the game affect your faction standing. Dig: At one point early in the game, two opposing factions will send you to see the same woman. One faction will want you to kill her, while the other wants you to collect an object from her. Whacking her will make one faction happy, but then the other faction will be pissed that you didn't collect the object. To complicate matters further, your target is a stringer for a *third* faction, and killing her will irk them as well. The way you handle each mission has a bearing on the way other characters in the game react to you, from pivotal players down to singularly minded grunts.

Your gear and biomod selections provide even more variability by allowing you to customize your play style to suit your personal gaming preferences. *DX2* features 15 different types of biomods. Each gives you special powers, like silent walking, hacking skills, or the ability to regenerate health. You can use only five biomods though, so you'll have to pick and choose what.

Our only complaint with *Invisible War* is the console-style interface, which doesn't work well with the mouse. It's difficult to know, for example, what something as basic as a mouse click will do when you click a gun in your inventory.

Still, *Deus Ex 2* is easily the best-designed PC game of the year, and well worth your time.

—WILL SMITH

MAXIMUM PC VERDICT 9

+ NEUROMANCER

Do-anything-you-want gameplay makes *Invisible War* a must for any real PC gamer.

– VIRTUAL LIGHT

Interface issues annoy, but don't spoil *Invisible War*.

$50, www.deusex.com

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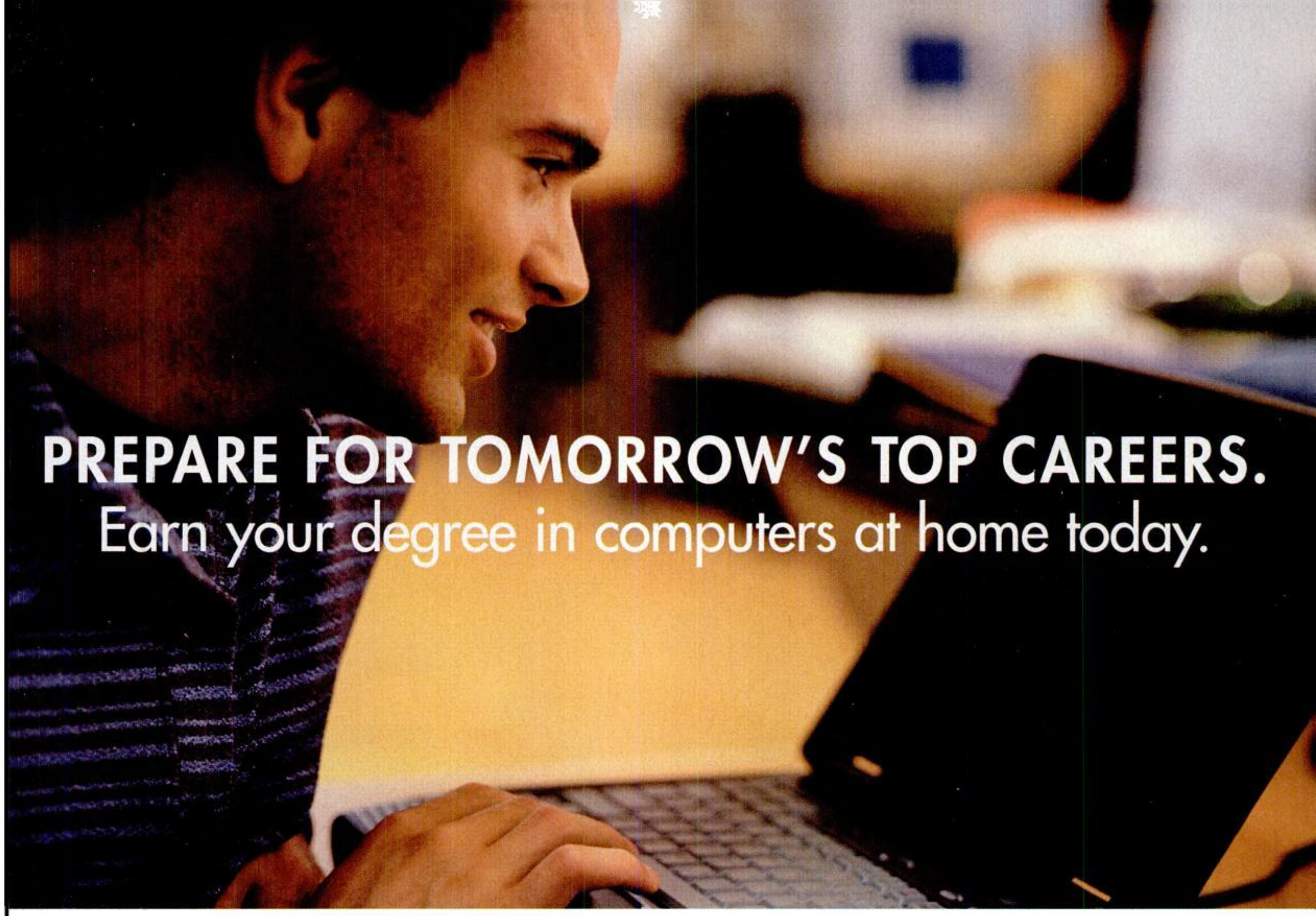

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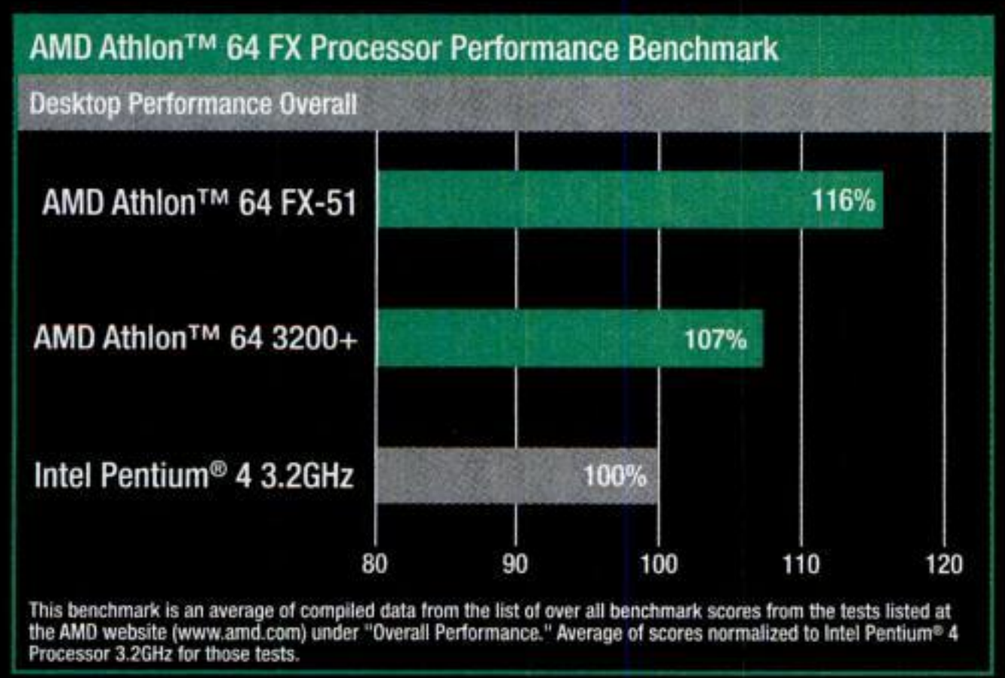

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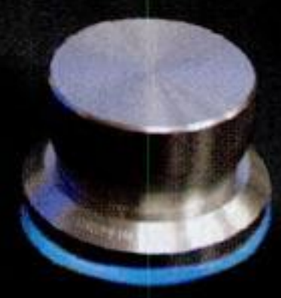

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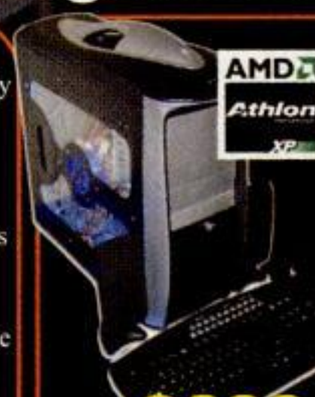

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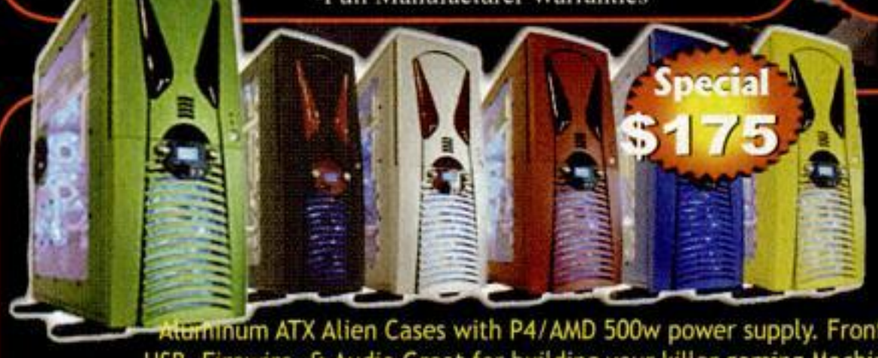

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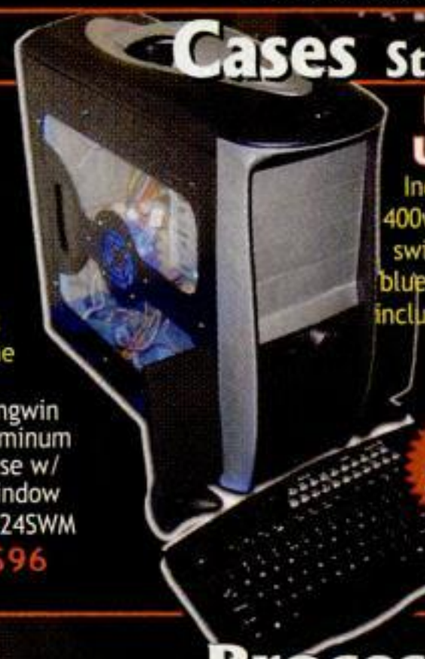

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Intel	D875PBZLK	$172	D865GLCLK	$129
	D865PERLX	$119	D865PERLK	$146
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	MS6758020	$191	65655010	$189
Abit	IC7G	$180	IC7MAX3	$209
Asus	A7N8XX	$82	A7V8XX	$69
	A7V8XLFWSR	$101	A7N8X Deluxe	$130
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	6570020	$80	MS6570010	$93
Soyo	KT600PLUS	$90	KT600DUPLAT	$140
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Processors Step 3

Celeron	2.2 GHz 128 cache	$82	P4	2.4GHz 512k 800	$202
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Memory Step 4

SDRAM

All Components	PC133512MB 32X8 133MHz		$89

DDR Memory

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Crucial	PC2100	256MB	DDR 266MHz	$52
Crucial	PC2100	512MB	DDR 266MHz	$80
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Crucial	PC2700	256MB	DDR 333MHz	$57
Crucial	PC2700	512MB	DDR 333MHz	$99
Crucial	PC3200	256MB	DDR 400MHz	$103
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52x24x52	IDE	BenQ 5224P	$49	$64
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52x24x52	IDE	Sony CRX300A Combo	$84	$91
52x24x52	IDE	Samsung SM352BRNS Combo	$77	$92
52x24x52	IDE	Teac CDW552	$57	$72
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			Beige	Color
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Video	Intel® Extreme Graphics 2
Audio	SoundMAX 4 XL with AudioESP audio subsystem
Modem	Creative Labs 56k V.92 PCI Modem
CDRW	52x32x52 IDE Internal CD-RW w/HDC Black Bezel
DVD	Pioneer DVD120 Tray Load DVD Player
Floppy	Mitsumi 1.44 3.5" Internal Floppy
Speakers	120 Watts - 2-Channel Stereo Amplifier
Keyboard	Windows 98/ME/2000/NT/XP &PS/2 & USB Fully Compatible
Mouse	400CPI sensative 2 Button Scrollable
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Hard Drive	Western Digital 120GB Serial ATA 7200RPM Hard Drive
Video	GeForce FX5600XT 256MB DDR
Audio	6-channel audio Onboard
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Mouse	400CPI sensative 2 Button Scrollable
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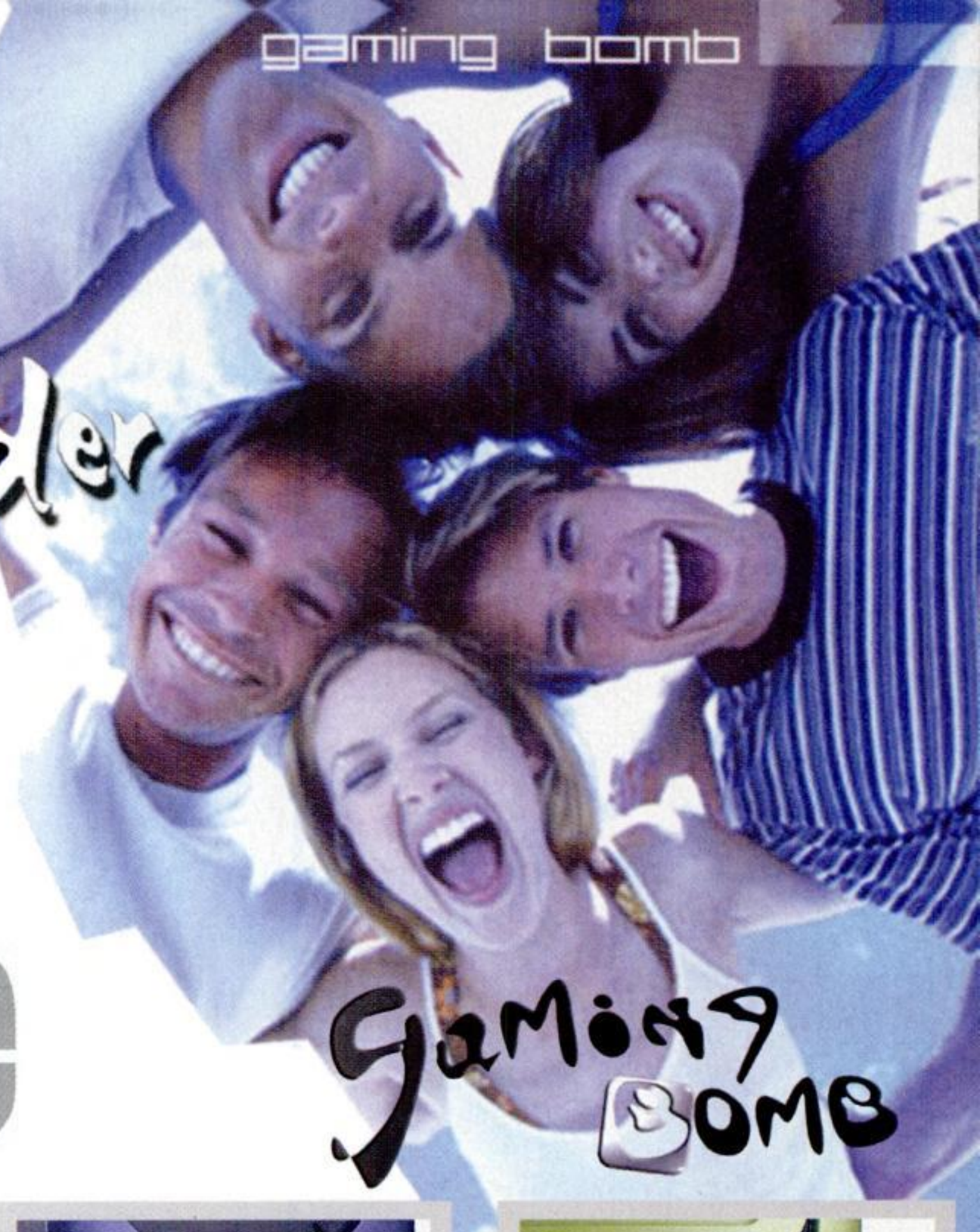

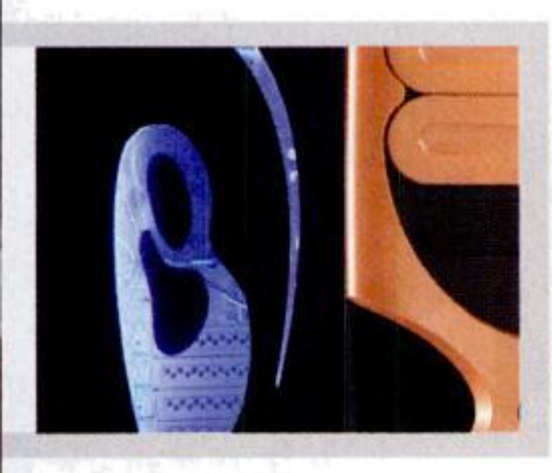

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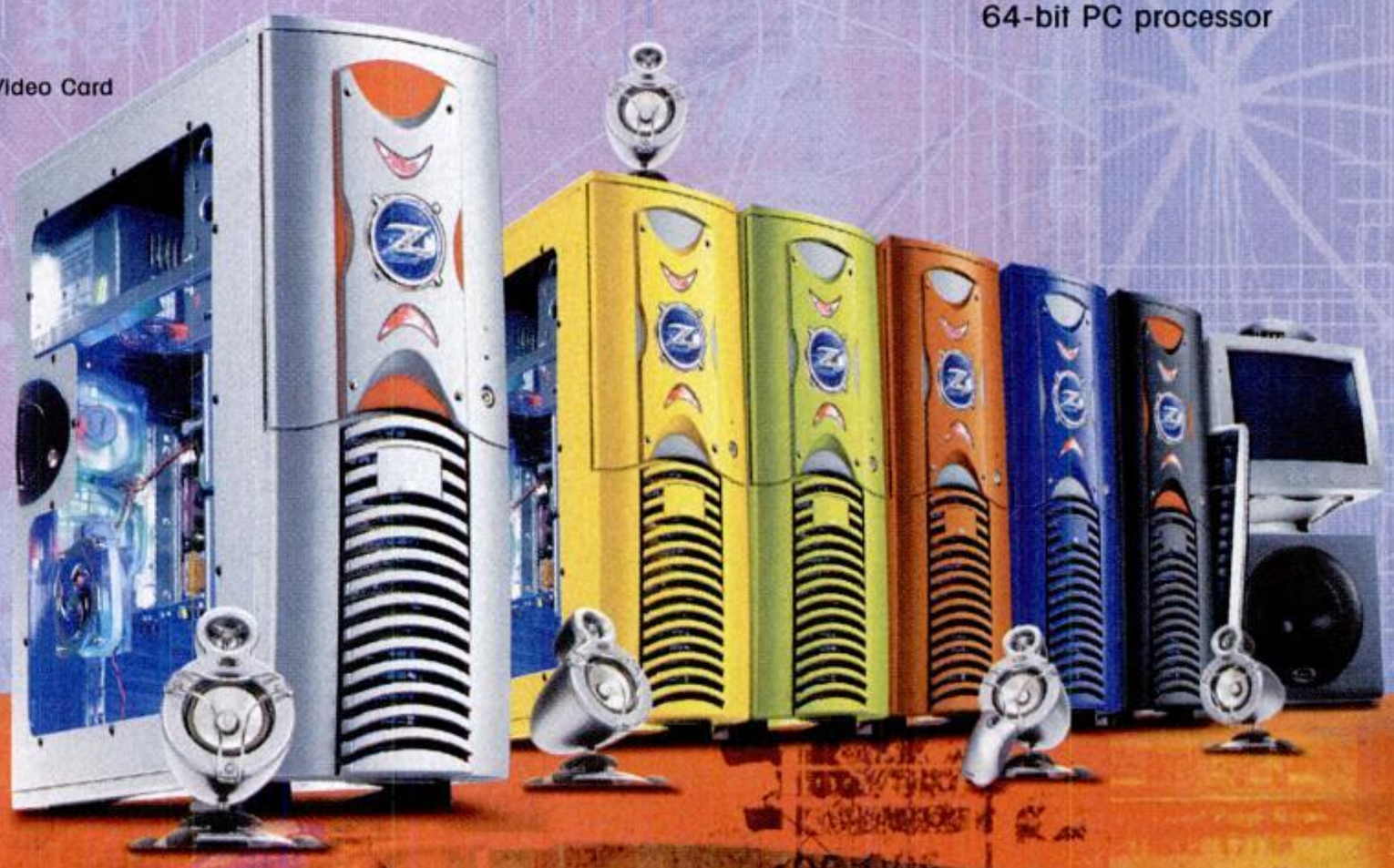

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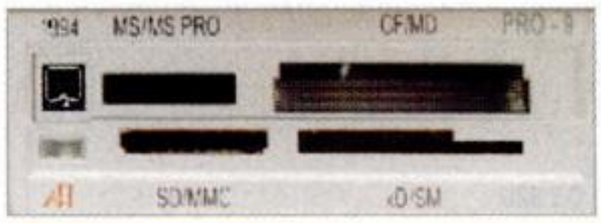

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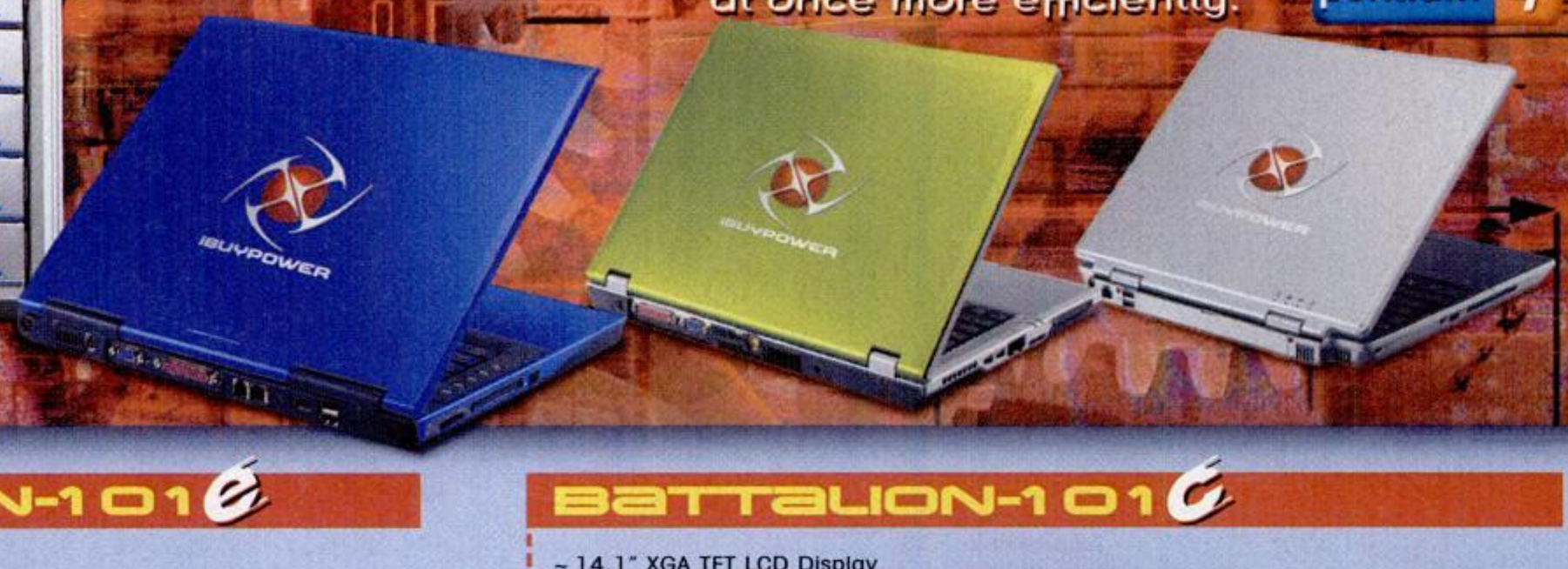

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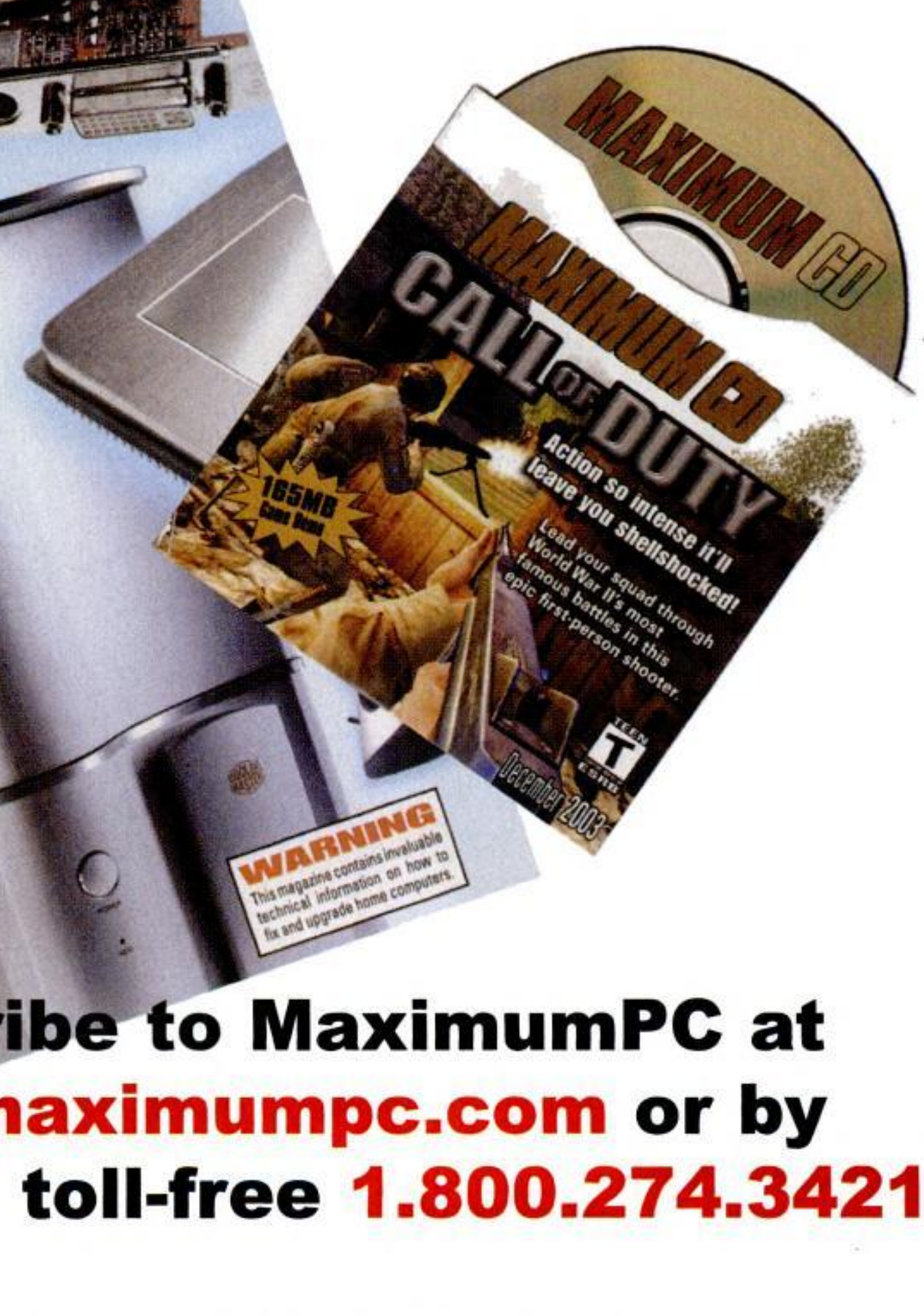

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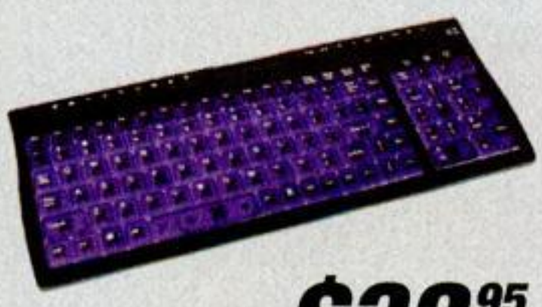

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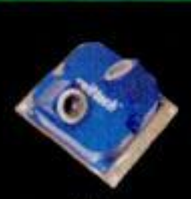

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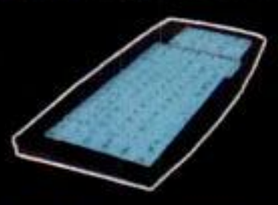

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THIS MONTH: John Zalewski's Lego PC

No, this is not a Legoland promotion for the latest Lord of the Rings installment. In fact, Zalewski describes the diorama as "quite random."

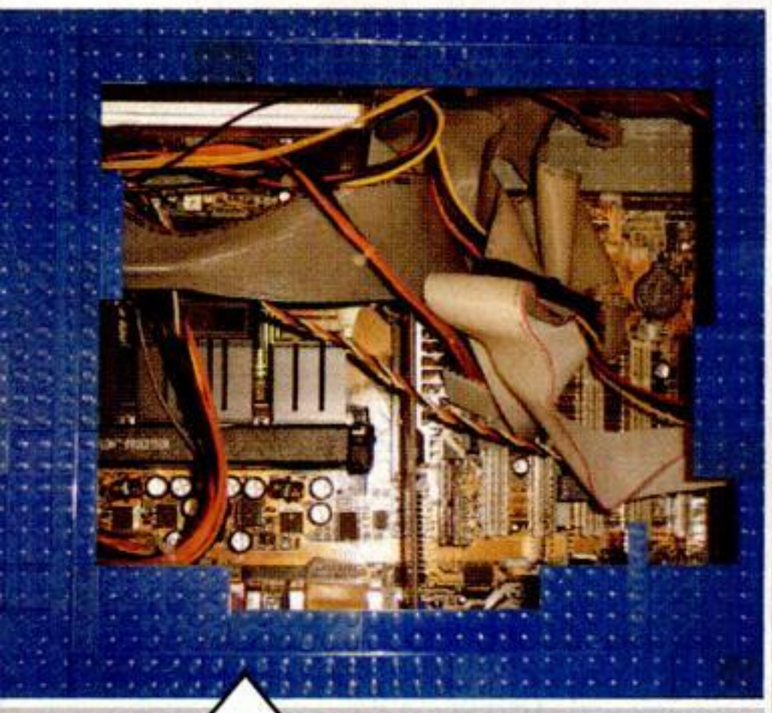
There's a lesson to be learned from the colorful plastic edifice you see before you. At least that's John Zalewski's conclusion after investing 24 hours and something like 3,000 interlocking plastic pieces in the construction of a fully functional Lego PC.

Actually, as Zalewski puts it, "the lessons didn't come from working with the PC, but by seeing the reactions it caused.

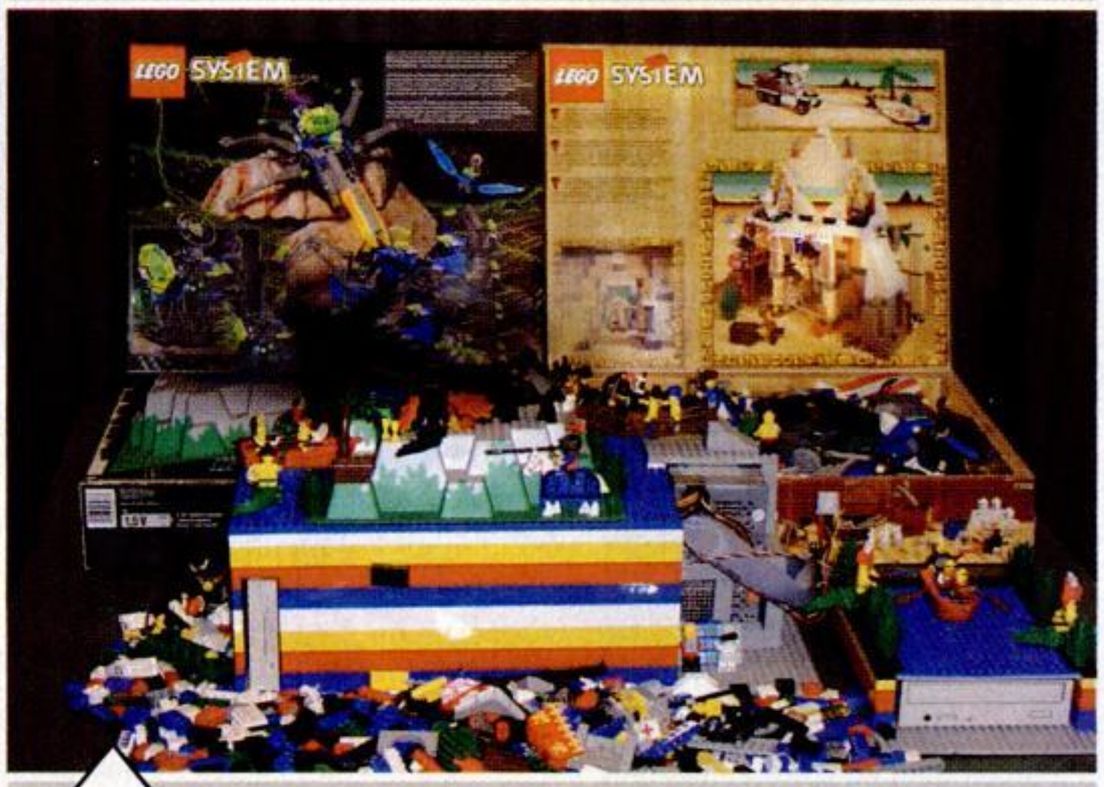
"Many adults got a kick out of the computer, mostly because they were surprised that it's possible for a computer to work in anything other than a big metal box." His cheerful enclosure also drew the attention of youngsters who "stopped fearing the computer and felt comfortable playing with it, whether it meant playing with the Legos themselves or playing a game on the Internet."

Before he could open all these hearts and minds, though, Zalewski had to first build the thing, and therein lies another pearl of the young man's wisdom: "My case represents the simplicity of building a PC in our modern day." Motherboard, hard drive, floppy drive, and optical drive were all mounted with screws after holes were drilled into the corresponding plastic parts of the case. The rest of the case was assembled by simply interconnecting the parts, just as you would for any other Lego project.

"The only glue I used was on the Lego power button, and that was used only to keep the Lego from falling off the power switch," says Zalewski.



"You'd be surprised to hear that the Lego PC runs quite cool," says Zalewski. Still, he sees the addition of a couple LED fans as a possible future project.



As easily as it came together, the PC can be taken apart... or expanded... or completely renovated. Because no glue was used in the construction, upgrading is a snap, literally.

Of all the characters that populate Zalewski's case, he identifies most with these fellows: "I'm big into technology and computers, and those guys are really cool looking."

For his winning entry John Zalewski wins $1,000 and a case of BAWLS to fuel his late nights of modding. You can win too! See page 8 for contest details.

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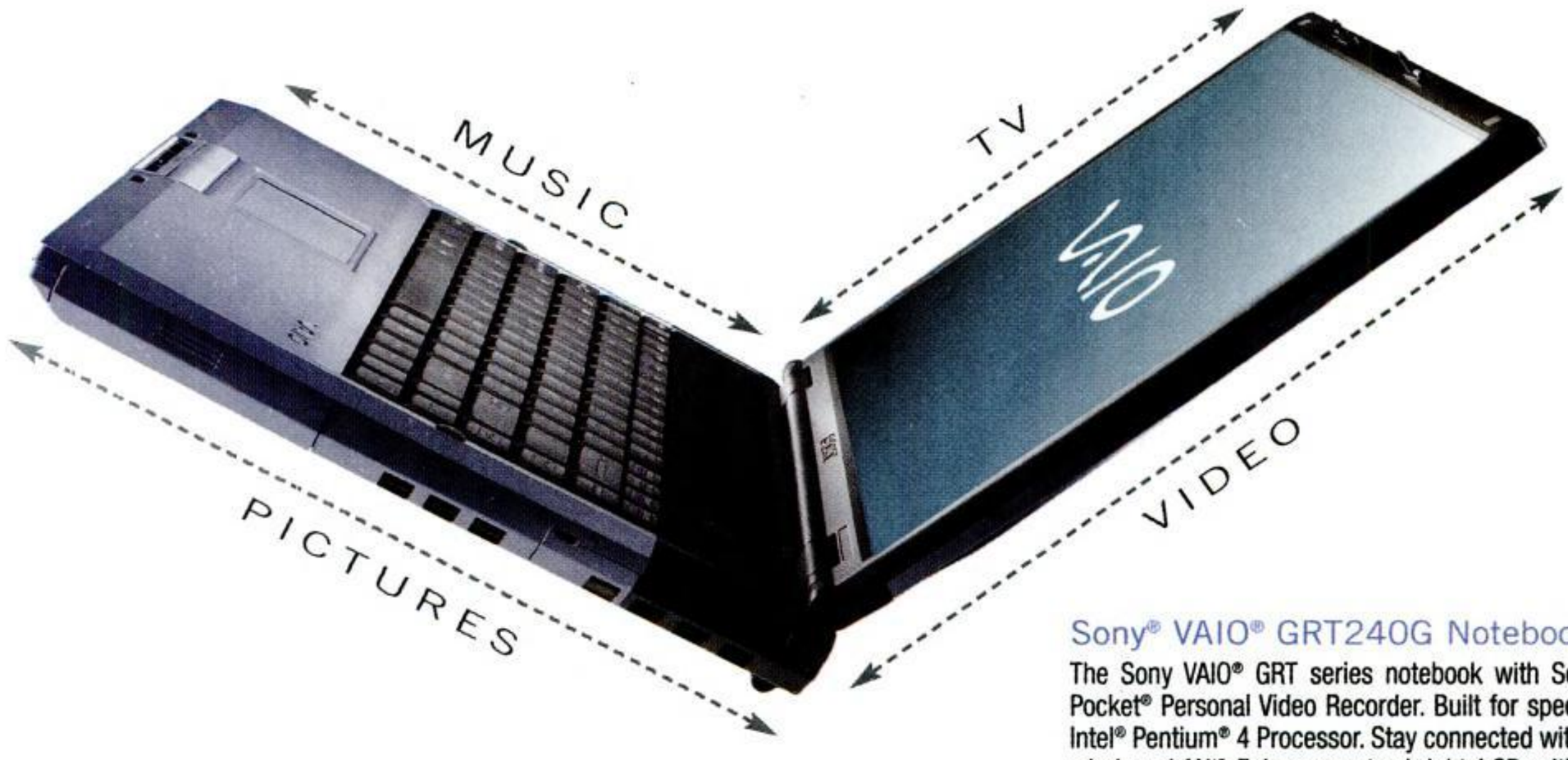

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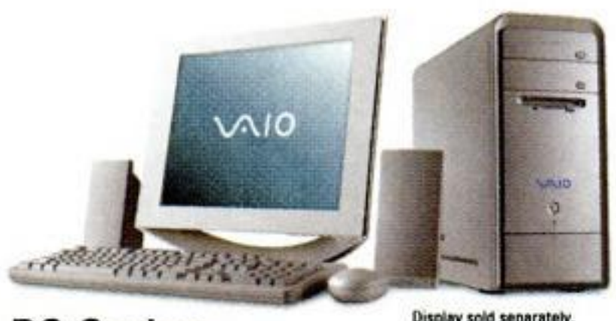

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DCR-DVD200
DVD Handycam®
Camcorder

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FREE carrying case

$999.99 As low as $25 per month for qualified customers.[13]

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Sony's MDR-NC11 Noise Canceling Fontopia® Ear-Bud Headphones offer you peace and quiet wherever you go.

SRS-MDR-NC11
Noise Canceling
Headphones

- Reduces noise by 70% (10dB) when noise canceling circuit is switched on
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- Miniature connection box for AAA battery
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- Battery DC1.5V, 1 size AAA battery
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100 FREE prints[9]

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  - Intel® 855 Chipset
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- Integrated CD-RW/DVD Combo Drive[4]
- Amazing battery life up to 6.5 hours[9]
- Integrated Bluetooth™ Wireless Technology[10]
- USB 2.0
- Stylish and sophisticated design in a 4.7-lb.-light[5] and 0.9–1.5"-thin body
- Included software: PictureGear Studio,™ SonicStage,™ DVgate Plus™
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After $100 mail-in rebate.[14]
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UPGRADES
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  - Intel® 855 Chipset
- Microsoft® Windows® XP Home Edition
- 40GB Hard Drive[2]
- 12.1" XGA TFT display
- 256MB RAM
- Integrated CD-RW/DVD Combo Drive[4]
- Sony VAIO® Creation Suite Standard software package
- 1-Year Limited Warranty[3]

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Sony's Smallest PC. Packed with Features.

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  - Integrated Wireless LAN: Intel® PRO/Wireless Network Connection 802.11b[18]
  - Intel® 855 Chipset
- Microsoft® Windows® XP Home Edition
- 40GB Hard Drive[2]
- 10.6" widescreen XBRITE™ LCD display
- 512MB RAM
- Integrated CD-RW/DVD Combo Drive[4]
- Amazing battery life up to 7.0 hours[9]
- Integrated swivel camera
- Sony VAIO® Creation Suite Standard software package
- 1-Year Limited Warranty[3]

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UPGRADES
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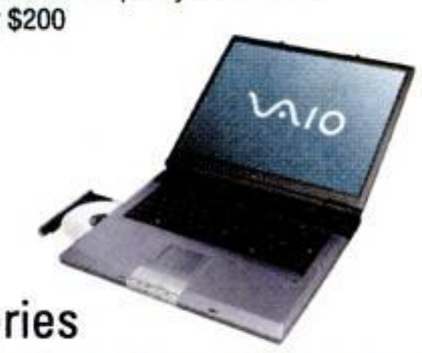

GRT Series
Transportable TV Entertainment Center

PCG-GRT280ZG
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- 1024MB RAM
- DVD±RW/CD-RW drive[4]
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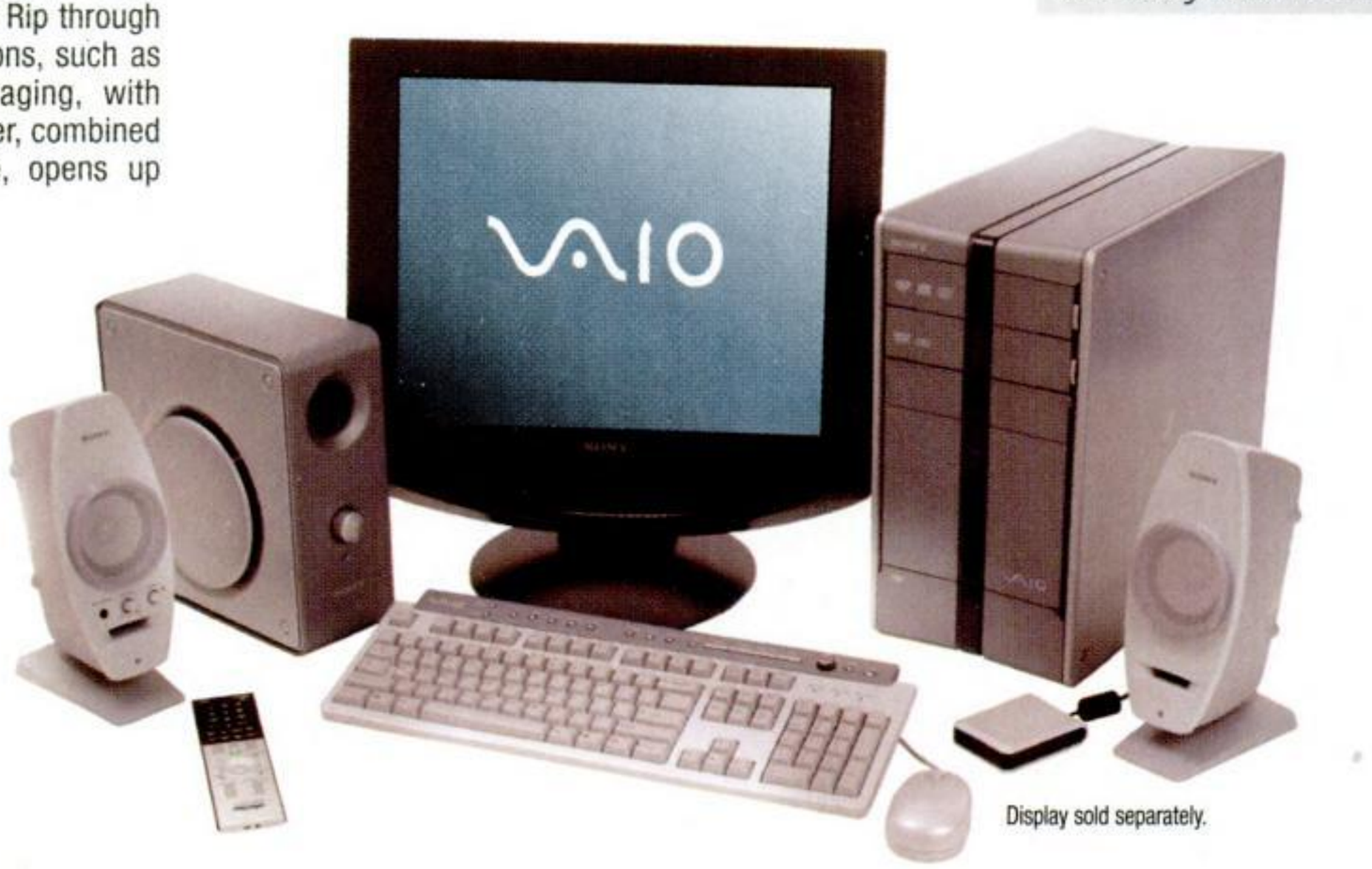

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If used with a Bluetooth-enabled mobile phone, ISP service fees apply. 11. Memory Stick PRO Duo media features vary and are dependent on the host hardware. 12. Some third-party software and devices may currently have limited functionality or not be compatible with this model. Please confirm with third-party vendor or manufacturer for compatibility. 13. On your Sony Financial Services Card, subject to credit approval. A minimum purchase of $299.99 is required. This is a same-as-cash promotion. If balance on these purchases is paid in full before the expiration of the promotional period indicated on your billing statement and your Account is kept current, accrued Finance Charges will not be imposed on these purchases. If balance on these purchases is not paid in full, Finance Charges will be assessed from the purchase date at the Standard Rate APR of 21.99%. For Accounts not kept current, the Default Rate of 24.99% APR will be applied to all balances on your Account. 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